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Ohio Army National Guard Mental Health Initiative

Risk and Resilience Factors for Combat-Related Posttraumatic Psychopathology and Post Combat Adjustment

Annual Report, June 2011

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Ohio Army National Guard Mental Health Initiative

Risk and Resilience Factors for Combat-Related Posttraumatic Psychopathology and Post Combat Adjustment

Annual Report, June 2011

INTRODUCTION

Previously conducted research has demonstrated that deployment accompanied by combat experience results in increased risk of posttraumatic psychopathology and other mental health conditions. The general objective of the Ohio Army National Guard Mental Health Initiative is to create a research infrastructure capable of supporting a series of projects that evaluate the relationships between resilience and risk factors, both cross-sectionally and longitudinally, before, during, and after deployment. The primary project will collect long-term data on a random representative sample of up to 3,000 service members of the Ohio Army National Guard, both treatment seeking and non-treatment seeking. Research visits will be conducted at study entry and every 12 months for a minimum of 10 years. The Telephone Survey will be completed on all main project participants, and 500 of these participants will also have an in-depth In-Person Survey on an annual basis for the duration of the study. The Genetics Repository component collects a DNA saliva sample from consenting participants in the main project.

BODY

The Initiative is designed to study the relationships between 1) pre-existing mental illness/substance use disorders, 2) deployment to Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF), and 3) post-deployment related mental health and overall psychosocial adjustment and functioning. The study will evaluate several groups of the Ohio Army National Guard: those deployed to OIF (Iraq, Kuwait, or Qatar), those deployed OEF (Afghanistan), those deployed to other theaters (Bosnia, Turkey, Uzbekistan, Kosovo, on a ship, or other), those deployed domestically, and those not deployed.

Project #1 (main cohort – Telephone Survey and In-Person Survey) and Project #2 (Genetics component) are currently ongoing. An ancillary project currently under regulatory review is entitled: "Neuroimaging and Genetic Investigation of Resilience and Vulnerability to PTSD" and the investigators expect to begin this pilot project by the end of 2011. A second ancillary project was submitted in January 2011 for R01 funding consideration at the National Institutes of Health and is entitled "Social environment and substance use: Using EMA to understand mechanisms". Additional future ancillary projects are dependent upon outside funding being awarded, and may include a family study focusing on barriers to access to mental health care for service members, their families, and survivors.

Sites

The team of individuals and infrastructures committed to this project is extensive and has a reporting relationship to the leadership of the Ohio National Guard, The Ohio Adjutant General Deborah Ashenhurst and Assistant Adjutant General of the Army COL John Harris, through the Guard's OHIOCARES Workgroup. The Principal Investigator

(PI) of the Ohio Army National Guard Mental Heath Initiative is Joseph R. Calabrese, M.D. and the Co-PI is Marijo Tamburrino, M.D. The Initiative includes a Coordinating Center based out of University Hospitals Case Medical Center (UHCMC) (Dr. Calabrese), and six operating research sites including University Hospitals Case Medical Center, the University of Toledo (Dr. Tamburrino), Columbia University Department of Epidemiology (Dr. Galea), a prestigious research survey firm, Abt SRBI, Inc. with a very long history of military research, the Ann Arbor VAMC Department of Psychiatry at the University of Michigan (Dr Liberzon), and Michigan State University's Biomedical Research and Informatics Center - BRIC (Dr Reed).

With Dr. Calabrese as the coordinating principal investigator, the UHCMC Coordinating Center is responsible for all aspects of project coordination (scientific, administrative, and fiscal) and the conduct of in-person assessments of 300 service members in their local communities. With Dr. Tamburrino as project Co-PI, the University of Toledo provides leadership and also conducts in-person assessments of 200 service members in their local communities. The Columbia University Department of Epidemiology responsibilities include, but are not be limited to, the design of the project's field procedures, including the annual Telephone Survey and In-Person Survey, scientific manuscript preparation, NIMH grant application, etc. Dr. Galea also serves as the primary interface between the project and the survey firm, Abt SRBI, which carries out the telephone surveys. The University of Michigan Ann Arbor VA Department of Psychiatry is responsible for the design, implementation, and oversight of the Genetics Repository, including laboratory and field procedures for biological sample collection, processing, storage, association analyses, etc. The Michigan State University Biomedical Research Informatics Center will provide all aspects of informatics needs for the In-Person Survey assessments, including data entry and management privileges, enrollment privileges, survey building privileges, etc.

Project #1

The primary study (Project #1) within this Initiative is a clinical epidemiology and health services project and is designed to function as the template upon which other projects, including but not limited to those of a translational research nature, will be superimposed. The first three specific aims of the primary research project were designed to build support and stimulate additional interest in the study of the role of resilience and risk in combat-related posttraumatic psychopathology and other similar adjustment problems.

Specific Aims of Project #1:

1. To study the relationship between deployment-related experiences and the development and trajectory of DSM-IV Axis I diagnoses
2. To document the factors across the life-course that are associated with resilience to DSM-IV Axis I diagnoses and with better post-deployment functioning
3. To study the relationship between National Guard-specific pre-deployment and post-deployment factors and the risk of development of DSM-IV Axis I disorders

Project #1 will interview up to 3,000 members of the Ohio National Guard, who were selected at random from the entire population of the Guard. All individuals who participate are interviewed for 1 hour by telephone on an annual basis, and began in November 2008.

A sub-sample of 500 participants of the telephone survey group is also interviewed on an annual basis and in-person, which on average last 2-3 hours. This sub-sample allows both for validation of key domains employed in the phone interviews and for further in-depth study of trajectory of psychopathology in this sample. Study personnel recommend that participants bring a family member, friend, or significant other for support and assistance during the interview. Family support often facilitates participant retention throughout the life of the project.

Research visits are conducted at study entry and every 12 months for a minimum of 10 years for both the telephone survey and in person survey. Currently, Year 3 of data collection is proceeding with the Telephone Survey sample. The participants have variable lengths of involvement and variable combat exposures, allowing us to suitably address the specific aims.

As recommended by the Scientific Advisory Board during the 2010 annual meeting, the investigators started a Dynamic Cohort with the start of Year 3 after receiving appropriate regulatory approvals. The investigators will sample new soldiers in the Guard on an annual basis with the intention of replenishing the sample in both the Telephone Survey and the In-Person Survey for participants who are unable to complete the annual survey for reasons including being currently deployed, lost to follow-up, etc.

Research Accomplishments from the Statement of Work for Project #1:
Tasks #1 - #5 from the Statement of Work delineate the critical events that must be accomplished in order for the project to be successful in terms of cost, schedule, and performance. Task #1 has been completed, with Tasks #2 through #5 currently in progress.

Task #1 – Baseline enrollment of up to 3,000 Ohio National Guard Members in the Telephone Survey, and 500 for the validation In-Person Survey, in order to be able to test Specific Aims #1 -3 with associated hypotheses. Enrollment for the Telephone Survey began 11/18/2008 after the recruitment period. Enrollment for the In-Person Survey began 12/10/2008. Baseline enrollment into both samples was completed on 11/17/2009 and 12/9/2009 respectively. The Telephone Survey enrolled N=2616, and the In-Person Survey enrolled N=500.

Task #2 – Annual participant follow-up to test Specific Aims #1 -3 with associated hypotheses. Year 3 interviews promptly began after Year 2 ended in late 2010 and are currently ongoing. As of 5/10/2010, the Telephone Survey has been completed with N=1382 participants (Year 3 follow up survey: N=865; Dynamic Cohort Baseline Survey: N=517), and N=209 for the In-Person Survey (Year 3 follow up survey: N=159; Dynamic Cohort Baseline Survey: N=50).

Task #3 – Performance of a descriptive analysis of the data collected from the primary and sub-sample group including the prevalence of current mental illness and voluntary triage to OhioCares. At least one peer-reviewed publication per year will be derived from the study data.

We have performed several analyses of the data collected from the baseline sample and Year 2 sample of participants. For baseline analyses, we examined the broad range of characteristics that are hypothesized to be associated with mental health conditions, as well as potential mediators of these associations. As analyses were completed over the

past year, we presented the results at scientific conferences and submitted manuscripts for peer-reviewed publication. The following manuscripts have been submitted to peer-reviewed journals:

- The Ohio Army National Guard Mental Health Initiative: Data Collection, Sampling Validation and Baseline Results – submitted to the International Journal of Methods in Psychiatric Research
- PTSD Comorbidity and Suicidal Ideation Associated with PTSD within the Ohio Army National Guard – submitted to the Journal of Clinical Psychiatry
- Pre-, peri-, and post-deployment characteristics and the risk of posttraumatic stress disorder among Ohio National Guard soldiers – submitted to Annals of Epidemiology

Please see **Appendix A** for copies of the three manuscripts mentioned above.

The following analyses and manuscripts are in process and are entitled:

- PTSD symptom differences after war-related and civilian-related potentially traumatic events in military personnel
- Baseline prevalence of Axis I conditions in the in-person survey sample
- Incident alcohol disorder and mental health conditions
- Suicidal ideation after war-related and civilian-related potentially traumatic events in military personnel.
- Ethics in trauma research: participant reactions to trauma questions in the Ohio National Guard
- Suicide history and suicidal ideation
- Construct similarity between PTSD and major depressive disorder
- Alcohol abuse and dependence in the Ohio National Guard
- War and civilian PTSD and criterion A2
- Interface between childhood trauma, socioeconomic status, and comorbidities
- Suicide and smoking

The goal of these ongoing analyses is publication; the first five analyses have been completed, with the six currently in process.

<u>PTSD symptom differences after war-related and civilian-related potentially traumatic events in military personnel</u>

There is evidence that different types of potentially traumatic events can result in varying symptoms of PTSD. Given the differences between war- and civilian-related traumatic events, it is possible that war-related and civilian-related PTSD may present with different symptoms. We used latent-class analysis to compare the pattern and distribution of the 17 PTSD symptoms to find similar groups (latent classes) of individuals with war-related and civilian-related potentially traumatic events. After identifying individuals with the highest score of symptoms from the latent class analysis, we compared the odds of each PTSD symptom between those with war vs. civilian related PTSD using multivariable logistic regression adjusting for gender, age, marital status, total experience of traumatic events and the time since the traumatic event. Those with war-related potentially traumatic events were more likely to have symptoms of physiologic reactivity (OR 5.59 95%CI 1.51-20.8), diminished interest in activities (OR 3.49, 95% CI 1.24-9.80) and feeling numb (OR 3.82, 95% CI 1.18 – 12.4). Future research should examine the implications of these increased symptoms among those

with war-related events including possible link to more chronic conditions or co-morbidity.

Baseline prevalence of Axis I conditions in the in-person survey sample

One of the unique characteristics of the OHARNG MHI is the annual collection of data on all DSM-IV Axis I disorders. Using the Structured Clinical Interview for DSM-IV-TR, a full clinical diagnostic panel was administered to 500 randomly selected OHARNG soldiers. In this paper we outline the baseline prevalences of these conditions as well as how these prevalences differ by deployment status. The most common condition ever present was alcohol abuse (28.2%), followed by major depressive disorder (22.4%), alcohol dependence (20.4%) and drug use disorder (15.6%). Lifetime prevalence rates of mental health disorders were 66.4% and current prevalence rates were 24.4% in the OHARNG. The most prevalent lifetime disorders were alcohol abuse (28.2%), major depressive disorder (22.4%), and alcohol dependence (12.5%), while the most prevalent current disorders were generalized anxiety disorder (5.0%), major depressive disorder (4.8%) and alcohol abuse (3.4%). In addition, the most prevalent lifetime classes of disorders were substance use disorders (52.2%), mood disorders (30.0%), and anxiety disorders (19.6%), while for current prevalent classes of disorders were anxiety disorder (13.8%), mood disorders (7.6%), and substance use disorder (7.0%). In those who have never been deployed the highest lifetime prevalence was substance use disorders (44.2%) and for current disorders it was anxiety disorders (11.7%). Those who were deployed were more likely to have PTSD ($p<0.01$) and alcohol abuse ($p<0.01$). The longitudinal follow-up of this in-person cohort will provide a detailed measure of the trajectories of all Axis I conditions among National Guard soldiers. This information will be pivotal in understanding the needs of reserve forces during the reintegration period of the soldier from war to civilian life.

Incident alcohol disorder and mental health conditions

Alcohol use disorders are common in military personnel; however, it is not clear if mental health conditions increase the risk of during and post deployment alcohol abuse among this population. Ohio National Guards were randomly selected to complete computer assisted telephone interviews between June 2008 and February 2009. The primary outcome was reporting alcohol abuse meeting DSM-IV criteria first occurring during or post-deployment. Primary exposures of interest included during-/post-deployment major depressive disorder (MDD) and posttraumatic stress disorder (PTSD). Predictive logistic regression was used to determine the independent correlates of during-/post deployment alcohol abuse. Of 963 deployed participants, 113 (12%) screened positive for during-/post-deployment alcohol abuse, of whom 35 (34%) and 23 (33%) also reported during-/post-deployment MDD and PTSD, respectively. In a multivariate model MDD (adjusted odds ratio [AOR] = 3.89, 95%CI: 2.12-7.15, $p<0.001$) and PTSD (AOR=2.73, 95%CI: 1.37–5.42, $p=0.004$) were associated with alcohol abuse. The conditional probability of during-/post-deployment alcohol abuse was 7%, 16%, 22%, and 43% among those with no MDD/PTSD, PTSD only, MDD only, and both PTSD and MDD, respectively. We observed a high prevalence of during-/post-deployment alcohol abuse among Ohio National Guards. Concurrent mental health conditions were highly predictive of developing alcohol abuse, and thus may constitute an etiologic pathway through which deployment-related exposures increase the risk of alcohol problems.

Suicidal ideation after war-related and civilian-related potentially traumatic events in military personnel.

There is recent evidence that the rate of suicide among Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) are increasing compared to the general population. While it is well known that PTSD is a risk factor for suicidal outcomes (suicidal ideation, attempted suicide and completed suicide) little is known about how the event that leads to PTSD may then be associated with suicidal ideation. Specifically, it is unclear how war-related PTSD and civilian-related PTSD are associated with suicidal ideation. We used the baseline results from the telephone sample (N=2616) of the OHARNG MHI to compare the association between PTSD and suicidality for those with war-related traumatic events and those with civilian-related traumatic. Among veterans with war-related traumatic events, having PTSD was minimally associated with suicidal ideation, adjusting for history of mental illness and other covariates (AOR 0.943, 95% CI 0.253 – 3.52). In contrast, there was an adjusted association between PTSD status and suicidal ideation among veterans with civilian traumatic events (AOR 4.47, 95% CI 2.04 – 9.82), and association persisted when the analysis was limited to assaultive events only (AOR 15.1, 95% CI 3.14 – 72.3). This highlights that suicide rates in the army may not be linked to increased rates of PTSD from returning OIF and OEF veterans. Future studies should confirm these findings that it is civilian-related PTSD that linked to suicidal thoughts as compared to war-related PTSD.

Ethics in trauma research: participant reactions to trauma questions in the Ohio National Guard

Several studies have shown that participants in trauma research generally appreciate their research engagement and do not suffer inadvertent adverse effects (Griffin, Resick, Waldrop & Mechanic, 2003). However, this has not been examined in military populations. We evaluated the effects of asking Ohio National Guard (ONG) members to recall details of their trauma exposure, and to determine factors that may put participants at risk of becoming upset by such assessments. Of 500 participants, 17.2% (n=86) reported being upset during the survey and 7.0% (n=6) of those reported still being upset at the end of the session. The following diagnostic groups were more likely to report being upset by any of the survey questions: 36.2% of those with a history of childhood physical abuse ($p<.0001$), 33.9% of those with a history of childhood physical neglect ($p=0.0004$), 37.1% of those with a history of childhood emotional abuse ($p<.0001$), and 47.5% of those with a history of childhood sexual abuse ($p<.0001$); 34% of those with suicidal ideation ($p=.001$); 37.3% of those participants who were female gendered ($p<.0001$); 24.4% of those participants who had a male-gendered interviewer ($p=.0002$); 22.5% of those who were the same gender as their interviewer ($p=.0057$); 31.8% of those who had Major Depressive Disorder ($p<.0001$), 37.5% of those who had Generalized Anxiety Disorder ($p=.013$), 50.0% of those who had Bipolar Disorder ($p=.0023$), 21.2% of those who had an alcohol use disorder ($p=.0274$), 28.6% of those who had a drug use disorder ($p=.0045$), and 61.3% of those who had Posttraumatic Stress Disorder ($p<.0001$). Most research participants were not upset as a result of the survey. Of the few participants who were upset by interview questions, those with mental health disorders were most likely to report being upset during the course of the interview, with only a small percentage still upset by the end of the interview. We did not find statistically significant differences from the following factors: high level of interpersonal conflict (found in the Conflict Tactics Scale), activity-limiting physical or emotional pain, number of deployments (stateside and overseas), marital status, employment, and socioeconomic status. Further research should be conducted to determine how a participant's emotional state at the end of an interview affects his/her continued participation in the research project. Also, it should be determined how elapsed time

from the trauma to the interview affects a participant's emotional reaction to recounting the details of his/her trauma.

Other

Please also see **Appendix B** for the descriptive data analysis presentation given to the external Scientific Advisory Board on May 24, 2011. **Appendix C** includes the presentation given to the Administrative Advisory Board on May 25, 2011.

Task #4 – Annual oversight meetings for the Initiative.
The *Administrative Advisory Board (AAB)*, consisting of state and local leaders, administrators, and stakeholders providing guidance on non-scientific issues,is held on an annual basis. The most recent meeting was held on May 25, 2011 at Beightler Armory in Columbus, Ohio with representatives from the following:

- Leadership of OANG including TAG MG Ashenhurst and brigade commanders
- Ohio Dept of Mental Health
- Ohio Dept of Veterans Services
- Ohio Dept of Alcohol & Drug Addiction Services
- Ohio Assoc of County Behavioral Health Authorities
- Veteran's Affairs
- Columbus Veteran Center

From the data presented at the AAB (see Appendix C), the study team's aim was to present an overview of the data and to focus on clinical topics of areas of unmet need that the Guard may wish to study in depth. The study team is moving beyond dissemination into translation by engaging the brigade commanders in meaningful problem-solving, including an in-depth discussion revolving around the issue of completed suicides and suicide prevention. The study team plans to add further questions to the annual survey in Year 4 to assess the Guard's other interventions and programs, in order to continue to provide meaningful feedback.

The *External Scientific Advisory Board*, consisting of nationally and internationally renowned individuals with strong scientific backgrounds providing critical feedback on the scientific merit of the project, will also be held on an annual basis. The most recent meeting was held on May 24, 2011 (see Appendix B). The primary recommendations resulting from the recent SAB meeting were further analyses of the existing data, as well as several items of "hot-topic" interest to add to the Year 4 surveys. The manuscripts under peer review will also be circulated to the SAB members for feedback.

Task # 5 – Financial Reporting is due quarterly via SF425, and has been submitted regularly and on schedule over the past year. The most recent report was submitted on April 25, 2011 for the first quarter 2011. Additionally, the most recent Quarterly Report was submitted to TATRC and USAMRAA on April 14, 2011 for the first quarter 2011.

Project #2

The Genetics Repository component (Project #2) is a study on genetic determinants of risk and resilience to the development of PTSD and other mental illnesses. This first translational project involves the creation of a repository of saliva DNA samples, which will be used to perform genetic association studies on selected candidate alleles and potentially genome-wide analyses at multiple levels. These may include cross-sectional

genetic association analyses of pre-deployment traits, longitudinal analyses to investigate genetic markers and functional polymorphisms involved in vulnerability to deployment-related psychiatric disorders (i.e. in case-control association analyses), as well as building models incorporating measures of deployment-related and pre-deployment environmental factors for vulnerability (i.e. gene x environment interactions). This will also allow for integrated research utilizing neuroimaging, psychophysiological, and neuroendocrine measures to investigate the effects of genetic variants on cognitive, behavioral, and physiological function at baseline and after deployment stressors.

Research Accomplishments from the Statement of Work for Project #2:
Task #1 – In order to test the 2 hypotheses in the Genetics Protocol, the participants in the Telephone Survey of Project #1 will be approached to participate in the Genetics Repository and will be asked to submit a saliva sample via a kit mailed to them. Final regulatory approval was granted 3/16/2010 by the DoD Office of Research Protections. Recruitment began on May 3, 2010 and will continue until all main study participants have been approached. As of May 10, 2011, 78% of participants have agreed to receive the Genetics kit in the mail after their Telephone Survey (N=1570 out of 2008) and 51% have returned their saliva sample, self report questionnaire, and consent form (N=807 out of 1570).

Task #2 – Upon receipt of saliva samples, the lab at the Ann Arbor VA processes them appropriately to provide genomic DNA preparation of the samples. As recruitment is still ongoing, no analyses have been completed to date.

Key Research Accomplishments

1. Completion of Year 1 (beginning November 2008) of data collection
   - Telephone Survey N=2616
   - In-Person Survey N=500
2. Year 2 data collection (beginning November 2009).
   - Telephone Survey N=1759 interviews completed thus far (end date August 1, 2011 per the approved protocol window)
   - In-Person Survey N=418 interviews completed (end date December 31, 2010 per the approved protocol window)
3. Year 3 data collection proceeding (beginning November 2010) as of May 10, 2011:
   - Telephone Survey N=1382 interviews completed thus far
     - Year 3 follow up interviews: N=865
     - Dynamic Cohort baseline interviews: N=517
   - In-Person Survey N=209 interviews completed thus far
     - Year 3 follow up interviews: N=159
     - Dynamic Cohort baseline interviews: N=50
4. Genetics Repository data collection (beginning May 2010) as of May 10, 2011:
   - Agreed to receive Genetics kit: N=1570 out of 2008 (78%)
   - Returned completed Genetics kit: N=807 out of 1570 (51%)
5. Scientific Advisory Board Meeting on May 24, 2011
6. Administrative Advisory Board Meeting on May 25, 2011
7. Three manuscripts submitted to peer-reviewed journals over past year
8. Disseminated data through 4 professional meetings (ISTSS, SER, APA, All Ohio and NASW)

Reportable Outcomes

Presentations of study data:

1. Oral presentations:
    a. Symposia presentation at the International Society for Traumatic Stress Studies 26th Annual Conference in November 2010, Montreal, Canada. Symposia composed of the following topics:
        - Ohio National Guard Mental Health Initiative. Galea S.
        - The Ohio National Guard Mental Health Initiative: baseline collection of a ten-year longitudinal cohort. Tamburrino M.
        - PTSD Comorbidity and Suicidal Ideation Associated with PTSD within the Ohio Army National Guard. Calabrese J.
        - PTSD Symptoms after war- and civilian-related traumas. Prescott M.
        - A "lifecourse" perspective on pre-, peri-, and post-deployment characteristics associated with the risk of posttraumatic stress disorder among Ohio Army National Guard soldiers. Galea S.
    b. PTSD Comorbidity and Suicidal Ideation Associated With PTSD within the Ohio Army National Guard. Calabrese, J. American Psychiatric Association Annual Conference in May 2011.
2. Poster presentations:
    a. Society for Epidemiological Research June 2010 annual meeting:
        - War-related PTSD: the context of trauma and symptoms of posttraumatic stress disorder in the National Guard. Prescott, M. *Second place research award*
        - Social and military characteristics associated with the co-occurrence of psychopathology among National Guard soldiers. Prescott, M.
        - Pre-, peri-, and post-deployment characteristics and the risk of posttraumatic stress disorder among Ohio National Guard soldiers. Goldmann, E.
    b. Ethics in trauma research: participant reactions to trauma questions in the Ohio National Guard. Wilson K. National Association of Social Workers Ohio Chapter Annual Conference October 2010, Columbus Ohio. *Winner of first place award.*
    c. Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard. Tamburrino M. All Ohio Institute of Community Psychiatry Annual Conference on March 25-26, 2011, Cleveland Ohio.
    d. Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard. Tamburrino M. American Psychiatric Association Annual Conference in May 2011.

*Abstracts (see **Appendix D** for reprints):*

1) National Association of Social Workers Ohio Chapter Annual Conference in October 2010:
    - Ethics in trauma research: participant reactions to trauma questions in the Ohio National Guard. Wilson K.
2) All Ohio Institute on Community Psychiatry in March 2011:
    - Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard. Tamburrino M.
3) American Psychiatric Association Annual Conference in May 2011:

- Psychiatric Comorbidity in the Baseline Sample of 2,616 Soldiers in the Ohio Army National Guard Study of Combat Mental Health. Calabrese J.
- Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard. Tamburrino M.

4) Joint Epidemiology Conference, Summer 2011:
   - Risky driving behavior among Ohio Army National Guard soldiers. Hoggatt K.
5) International Society for Traumatic Stress Studies 27th Annual Meeting in November 2011:
   - Mental health disorders increase the risk of during and post-deployment alcohol abuse among Ohio Army National Guards. Marshall B.
6) American College of Neuropsychopharmacology (ACNP) 50th Annual Meeting in December 2011. Panel Presentation: Identifying predictors of trauma response: State of the art of current prospective studies of PTSD:
   - Psychiatric Comorbidity in the Baseline Sample of 2,616 Soldiers in the Ohio Army National Guard Study of Combat Mental Health. Calabrese J.

*Manuscripts under Peer Review (see **Appendix A** for reprints):*

1) Goldmann E, Tamburrino M, Liberzon I, Prescott MR, Calabrese J, Slembarski R, Galea S. (2011). Pre-, peri-, and post-deployment characteristics and the risk of posttraumatic stress disorder among Ohio National Guard soldiers. *Annals of Psychiatry*, manuscript under review since 1/21/2011.
2) Calabrese J, Prescott M, Tamburrino M, Liberzon I, Slembarski R, Goldmann E, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano M, Sizemore J, and Galea S. (2011). PTSD Comorbidity and Suicidal Ideation Associated With PTSD within the Ohio Army National Guard. *Journal of Clinical Psychiatry*, IN PRESS.
3) Tamburrino M, Prescott M, Calabrese J, Liberzon I, Slembarski R, Goldmann E, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Derus A, Serrano M, Sizemore J, and Galea S. (2011). The Ohio Army National Guard Mental Health Initiative: Data Collection, Sampling, Validation and Baseline Results. *Journal of Methods in Psychiatric Research*, manuscript under review since 3/4/2011.

Manuscripts in Preparation:

1. Marshall B, Prescott M, Calabrese J, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano M, Sizemore J, and Galea S. (2011). Relationship between Mental health Disorders and Alcohol Abuse during and following deployment among Ohio Army National Guard. *Journal TBD.*
2. Prescott M, Calabrese J, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano M, Sizemore J, and Galea S. (2011). PTSD symptom differences after war-related and civilian-related potentially traumatic events in military personnel. *Journal of Traumatic Stress.*
3. Prescott M, Calabrese J, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano M, Sizemore J, and Galea S. (2011). Suicidal ideation after war-related and civilian-related potentially traumatic events in military personnel. *Journal of Traumatic Stress.*
4. Prescott M, Calabrese J, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano M, Sizemore J, and Galea S.

(2011). Baseline prevalence of Axis I conditions the Ohio Army National Guard Mental Health Intitative clinical cohort. *Journal of Clinical Psychiatry*

Miscellaneous:

1. Genetics Repository at Ann Arbor VA – accepting saliva DNA samples
2. Informatics – Michigan State University's RIX database for the In-Person Survey, Abt SRBI, Inc.'s CATI database for the Telephone Survey

Supplementary Funding

Concerning our efforts to obtain additional funding for ancillary studies (as per the specific aims in the protocol) over the past year:

1. The University of Toledo and Ann Arbor VA sites (Tamburrino and Liberzon) have obtained internal institutional funding for a small pilot project entitled: *Neuroimaging and Genetic Investigation of Resilience and Vulnerability to PTSD*. The pilot study has obtained UT and VA IRB approvals, and is pending review and approval by the UHCMC IRB. The investigators hope to begin recruitment in early summer.
2. On January 6, 2011 the study investigators (Galea) submitted an R01 grant application to the Institutes of Health for the following proposed ancillary study: *Social environment and substance use: Using EMA to understand mechanisms*. If funded, earliest possible start date is September 2011.

Conclusion

This project will provide the military with novel, landmark long-term, prospective data that will elucidate novel predictors of resilience to combat-related stress. Compared to existing research in this area, this project is unique because it is population-based and does not limit its scope of study to only VA-treatment seeking veterans. Accordingly, this study is likely to uncover rates of PTSD and other mental conditions following combat that differ from those found in previous scientific reports.

Many previous projects have only utilized screening assessments, which can limit generalizability. The Telephone Survey, using a large representative sample, incorporates many scales which go beyond screening in various domains. Additionally, the In-Person Survey methodology permits a more thorough, detailed prospective study of psychopathology and psychosocial factors, resulting in a wealth of data on this important military population.

The Ohio National Guard has expressed interest and commitment in having their programs assessed (i.e. suicide prevention and alcohol abuse awareness) via the annual surveys in order to adapt and improve their services and training programs. In conjunction with the Guard, the investigators are currently incorporating these questions into the Year 4 surveys, slated to begin in November 2011.

This project also incorporates a genetics repository in conjunction with detailed, and prospectively longitudinal psychosocial data. The genetics component will allow us to study genetic determinants of risk and resilience to the development of PTSD and other mental illnesses.

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Potentially modifiable pre-, peri-, and post-deployment characteristics associated with deployment-related posttraumatic stress disorder among Ohio Army National Guard soldiers

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ABSTRACT

Purpose: To evaluate potentially modifiable deployment characteristics – pre-deployment preparedness, unit support during deployment, and post-deployment support – that may be associated with deployment-related posttraumatic stress disorder (PTSD).

Methods: We recruited a random sample of 2,616 Ohio Army National Guard (OHARNG) soldiers and conducted structured interviews to assess traumatic event exposure and PTSD related to the soldiers' most recent deployment, consistent with DSM-IV criteria. We assessed preparedness, unit support, and post-deployment support using multi-measure scales adapted from the Deployment Risk and Resilience Survey.

Results: The prevalence of deployment-related PTSD was 9.6%. In adjusted logistic models, high levels of all three deployment characteristics (compared to low) were independently associated with lower odds of PTSD. When we evaluated the influence of *combinations* of deployment characteristics on PTSD development, we found that post-deployment support was an essential factor in the prevention of PTSD.

Conclusions: Results show that factors throughout the lifecourse of deployment – in particular, post-deployment support – may influence the development of PTSD. This suggests that the development of suitable post-deployment support opportunities may be centrally important in mitigating the psychological consequences of war.

Keywords*:* Stress Disorders, Post-Traumatic, Military Personnel, War

LIST OF ABBREVIATIONS AND ACRONYMS

PTSD – Posttraumatic stress disorder

OIF/OEF – Operation Iraqi Freedom/ Operation Enduring Freedom

SES – Socioeconomic status

OHARNG - Ohio Army National Guard

DRRI – Deployment Risk and Resilience Inventory

PCL-C - PTSD Checklist Civilian version

DSM-IV – Diagnostic and Statistical Manual of Mental Disorders

CAPS - Clinician administered PTSD scales

OR - Odds Ratio

CI – Confidence Interval

INTRODUCTION

Several recent studies have documented the prevalence of psychopathology after combat. Studies of veterans from the first Gulf War reported current posttraumatic stress disorder (PTSD) prevalence at 10.1%.(1) Other studies found prevalence estimates of 12.9% and 6.2% among U.S. Army soldiers in Iraq and Afghanistan, respectively, and 12.2% among Marine Corps soldiers who served in Iraq.(2) The Millennium Cohort Study, an ongoing prospective study that assesses mental health in current and former members of the U.S. military, reported at baseline that 2.4% of respondents had PTSD in the past month.(3) Although there are fewer such studies, some work has also estimated the burden of PTSD among National Guard and Reserve soldiers, ranging from 2.0% in Gulf War veterans(4, 5) to 12.7% in Iraq War veterans.(6) These soldiers have historically contributed only part-time to the military and have principally participated in mostly domestic incidents. However, more recently they have increasingly been deployed to war zones oversees. As of 2008, Guard and Reserve forces constituted approximately 11% of current combat forces in Operation Iraqi Freedom (OIF)and 21% in Operation Enduring Freedom (OEF).(7) Some studies have suggested that Guard and Reserve soldiers are more vulnerable to post-deployment psychopathology compared to active duty soldiers due to the strain of returning to their non-military responsibilities and receiving less support from military peers.(8, 9) Understanding what factors influence PTSD development in this population may shed light on this vulnerability.

Risk factors for PTSD can be divided into three groups based on their temporal relationship with the traumatic event (i.e. characteristics from before, during, and after the event).(10) Studies that use data from various military populations – e.g. veterans of the

Vietnam War,(11) the first Gulf War,(12) OIF and OEF(13, 14) as well as soldiers and peacekeepers in other combat locations(15) – have examined the relation between these types of variables and PTSD following deployment. These studies have found associations between PTSD and pre-deployment risk factors such as socioeconomic status (SES), early trauma history, childhood antisocial behavior, friendships and family environment in childhood, age at entry to Vietnam, and exposure to pre-deployment stressors.(12, 16-18) Other studies report relations between factors during deployment such as traditional combat experience, difficult living/working environment, concerns about family at home, unit support, experience with atrocities or abusive violence, and perceived life threat and PTSD.(12, 15, 18-20) Post-deployment factors such as additional stressful life events, hardiness, and social support also are influential in the development of PTSD, with perceived functional social support acting as a particularly strong predictor of the disorder.(15, 17, 18, 21-23)

Although some of the risk factors identified in these studies are inextricable from the experience of war, other factors may well be modifiable and can therefore point to potential interventions that may mitigate the psychological consequences of war. This study considers modifiable factors pre-, peri-, and post-deployment that may influence the risk of PTSD using baseline data from a 10-year prospective study of a current Army National Guard population. We approach the study from a lifecourse perspective, considering both the independent and the interactive contribution of these factors.(24) Although we evaluate the independent relations between each deployment factor and deployment-related PTSD, we are particularly interested in how these factors together influence risk of PTSD. We hope that through this approach we might (1) identify potential

areas of intervention that can be modified throughout the course of deployment to together mitigate the consequences of deployment experience or (2) identify one modifiable deployment characteristic whose improvement may have the greatest benefit to soldiers' post-deployment psychological well-being.

METHODS

We invited 12,225 Ohio Army National Guard (OHARNG) soldiers to participate in the study; in an effort to recruit sufficient numbers of female soldiers, letters were sent to all female OHARNG personnel. 2,616 male and female soldiers ultimately took part in the study (cooperation rate, 68.3%; response rate, 43.2%). We conducted 60-minute structured telephone interviews to assess lifetime traumatic event experience (in civilian life and during most recent deployment), symptoms of PTSD, depression, and generalized anxiety disorder, social support, general health history, overall military and deployment experience, substance use and other behaviors, and demographic information. Additional information about this study can be found in Tamburrino et al (Under review).

We assessed pre-, peri-, and post-deployment domains associated with repondents' most recent deployments – specifically, pre-deployment military preparedness, unit support during deployment, and post-deployment support – using validated instruments from the Deployment Risk and Resilience Survey (DRRI). Each instrument comprised several items asking if the participant had that particular experience; scores per item ranged from 1 (strongly disagree) to 5 (strongly agree). We summed item scores to create a total score for each domain. Scores were calculated for all participants, even if not all

questions were answered. (The unanswered questions were treated as having a score of 0, a neutral response.) All three domains showed good internal consistency in our study population (standardized Cronbach's coefficient alpha = 0.7, 0.8, 0.7, respectively). We created dichotomous variables for these factors (e.g. high vs. low preparedness) based on their median scores. Scores above 21, 29, and 24 indicated high preparedness, high unit support, and high post-deployment support, respectively. We then created eight dummy variables to represent combinations of pre-, peri-, and post-deployment experiences (e.g. high preparedness, low unit support, high post-deployment support).

We assessed traumatic event experience during the most recent deployment using a list of 20 traumatic events from the DRRI, as well as one item from an additional list of 19 other traumatic events that asks about combat experience, used by Breslau et al.(25) We used the PTSD Checklist (PCL-C), a 17-symptom self-report measure based on DSM-IV criteria B, C, and D,(26) to evaluate symptoms of reexperiencing, avoidance/numbing, and increased arousal related to a deployment traumatic event.(27) If a participant experienced more than one event during deployment, we asked PTSD symptom questions based on the event reported as the "worst". Participants indicated how much each symptom bothered them from 1 (not at all) to 5 (extremely). Scores can range from 17 to 85.(28) Additional questions assessed DSM-IV criteria A2 (feelings of intense fear, helplessness, or horror in response to the event), E (at least one-month duration of symptoms), and F (clinically significant distress or disability due to symptoms).(27) Participants had to meet all six DSM-IV criteria to be considered a PTSD case. Clinical in-person interviews were conducted among a random sample of telephone survey participants (n=500) to validate the PCL-C using the Clinician-Administered PTSD Scale

(CAPS).(29, 30) Clinicians were blinded to responses from the telephone survey. Validation analyses yielded excellent internal consistency and good concordance between the telephone and in-person PTSD instruments (Tamburino et al, Under review).

We used bivariable and multivariable logistic regression analysis to examine the relation between the deployment-related characteristics and their combinations and symptoms of deployment-related PTSD, among those who had experienced at least one deployment-related traumatic event during their most recent deployment. Regressions were adjusted for military experience (paygrade, number of deployments, location of most recent deployment in a conflict area or non-conflict area, number of deployment-related traumatic events experienced during most recent deployment) and other sociodemographic characteristics (age, gender, race, household income, educational attainment, and marital status, all self-reported). We used SAS 9.2 (SAS Institute Inc., Cary, NC) for all analyses.

RESULTS

Table 1 shows descriptive characteristics of the sample population (n=2,616) and of those soldiers who had been deployed (n=1,668, 63.8% of the sample). The majority of participants were men (85.2%), more participants reported being white than another race (87.7% vs. 12.3%), and almost half of the sample was married (46.9%). Almost everyone had experienced at least one traumatic event in their lifetime (94.6%). Of those soldiers who had been deployed, 1294 (77.6%) experienced at least one traumatic event during their most recent deployment. The deployed population was significantly older than the total population; more were male, married, officers, had higher income and educational attainment, and greater traumatic event experience (all $p<0.01$).

Table 2 shows the pre-, peri-, and post-deployment characteristics included in this study – training and deployment preparedness, unit support, and post-deployment support, respectively – as they relate to the participant's most recent deployment among those soldiers who have been deployed. As a domain, preparedness had the lowest median score (21.0) and unit support had the highest (29.0). Among the individual items, feeling that people at home did not understand what the participant had been through while in the Armed Forces had the lowest median score (2.0). Score ranges by domain show that participants failed to answer a greater number of questions in the post-deployment support section than in the other sections.

Table 3 reports the distribution of the eight deployment characteristic combinations among those who have been deployed. The largest proportion of the sample reported high levels for all three domains (25.2%). The high preparedness, high unit support, and low

post-deployment support combination was reported by the smallest proportion of soldiers (3.2%). The prevalence of deployment-related PTSD (given exposure to a deployment-related traumatic event) was highest among those who reported low for all three domains (22.4%) and lowest among those who reported high preparedness, low unit support, and high post-deployment support (4.2%). Overall, the prevalence of PTSD from a deployment-related event was 9.6%.

High preparedness, high unit support, and high post-deployment support (vs. low levels) were all associated with lower odds of PTSD in separate multivariable models (preparedness: odds ratio (OR)=0.6, 95% confidence interval (CI)=0.4, 0.9; unit support: OR=0.5, 95% CI=0.3, 0.8; post-deployment support: OR=0.3, 95% CI=0.2, 0.4). Figure 1 shows results from multivariable regression analysis that modeled deployment characteristic combinations as dummy variable predictors of PTSD, adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced (one vs. two or more). Four of the characteristic combinations – all of those that included *high* post-deployment support – had significantly lower odds of PTSD with the low preparedness, low unit support, and low post-deployment support combination as the reference group. Specifically, soldiers reporting (1) low preparedness, low unit support, and high post-deployment support; (2) low preparedness, high unit support, and high post-deployment support; (3) high preparedness, low unit support, and high post-deployment support; and (4) high levels of all three domains had significantly lower odds of developing PTSD than those who reported low levels of all three domains (OR=0.3, 95% CI=0.1, 0.5; OR=0.2, 95%

CI=0.1, 0.4; OR=0.2, 95% CI=0.1, 0.4; and OR=0.2, 95% CI=0.1, 0.4; respectively). The odds of PTSD were not significantly lower for any combination that included low post-deployment support, compared to the reference group.

DISCUSSION

Characteristics at various stages of deployment may influence the likelihood of developing PTSD from a deployment-related traumatic event in this population. We found that reporting high levels (compared to low levels) of the three pre-, peri-, and post-deployment factors –preparedness, unit support, and post-deployment support – were all independently associated with lower odds of deployment-related PTSD, consistent with findings from previous studies.(15, 20, 21, 31-33) Soldiers who report high training and deployment preparedness – i.e. know what to expect, have adequate supplies and training – may be more psychologically prepared for the potentially traumatic events they may experience during combat and thus may be more able to appraise the level of threat related to these experiences. One recent study found that soldiers who reported high preparedness more realistically appraised the threat involved in different levels of combat exposure, while less prepared soldiers perceived even low level combat as highly threatening.(32) Perceived threat is thought to be an important link between combat experience and PTSD (i.e. the greater the perceived threat, the greater the likelihood of developing PTSD from the experience).(12, 18, 19, 34) Preparedness may play a role in the development of PTSD through its relation with perceived threat, perhaps by reducing the level of threat perceived by soldiers in situations that are actually less threatening.(32)

Reporting high levels of unit support, compared to low levels, also appeared protective against the development of PTSD from a deployment-related traumatic event. This lends support to findings that suggest a positive influence of high levels unit support and cohesion on mental health among U.K. and U.S. soldiers in the Iraq and Afghanistan conflicts who have experienced combat.(20, 31) Receiving support from one's unit during deployment may promote soldiers' resilience to PTSD by increasing self-efficacy (i.e. personal belief in one's ability to handle situations or perform well) and/or mitigating the psychological consequences of war-zone stressors through strengthened coping abilities.(20, 35, 36)

Post-deployment social support seemed to confer the most protection against PTSD of the three deployment characteristics evaluated in this study. Studies of both civilians and soldiers have documented post-event social support as a strong predictor of PTSD and other psychopathology.(13, 15, 21, 37-40) Receiving support from others after a traumatic event may enhance an individual's coping abilities or influence how the individual evaluates the stressful situation and subsequently reacts to it emotionally and behaviorally, which may buffer the psychological consequences of traumatic event experience.(41-44)

When we examined the combined effects of different deployment characteristics, we found that only characteristic combinations that included high post-deployment support (as opposed to low post-deployment support) were significantly associated with lower odds of PTSD (compared to the low preparedness, low unit support, low post-deployment support combination). This may provide evidence of the importance of post-deployment social support in preventing the development of PTSD from deployment-related traumatic

events. It also suggests that for soldiers who experience low post-deployment support, being well prepared and/or having high unit support may not provide as strong a defense against post-deployment psychological illness.

This study benefited from its population-based design, allowing us to understand relations between deployment characteristics and PTSD in the OHARNG as a whole, although findings may not be generalizable to all branches of the military. It is important to note, however, that the cross-sectional nature of our study introduces limitations to the study findings; in particular, similar to other studies of deployment characteristics, results may suffer from recall bias.(20) For example, respondents' psychological well-being may have influenced their reporting of preparedness, unit support, and post-deployment support.(20, 37, 45) However, there is evidence that characteristics such as unit support remain significantly associated with PTSD in studies with longitudinal design that have adjusted for psychopathology at baseline (before deployment).(20) Finally, using a lay-person assessment of PTSD prevented us from formally diagnosing respondents. We did, however, benefit from the use a validated structured assessment of PTSD (as well as validated instruments for the three DRRI deployment characteristics).

Preparedness, unit support, and post-deployment support are examples of modifiable characteristics of deployment experience that may influence psychological outcomes independently and in combination. Although observational data such as these are limited in their ability to suggest the outcomes of interventions, this study does suggest that future efforts to evaluate interventions that aim to improve post-deployment social

support in particular may fruitfully point to approaches that mitigate the mental health consequences of war.

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LEGEND FOR TABLES AND FIGURES

Table 1. Characteristics of the OHARNG study participants. These are the total number and percentage breakdown of demographics and military characteristics among those in the entire sample and then among those with deployment experience (64% of the entire sample). Note: Some percentages do not add up to 100% due to missing values.

Table 2. Characteristics of the most recent deployment. These are the characteristics (mean, median and Chronbach's alpha) reported from the Deployment Risk and Resilience Inventory (DRRI). Each question was asked on a scale from 1 – 5 with 1 being strongly disagree and 5 being strongly agree.

Table 3. Distribution of the DRRI characteristics and the total number and % of those with the corresponding DRRI characteristics and deployment related PTSD. Note: this only includes those who were at risk for PTSD (N=1294) as they experienced at least 1 criterion A traumatic event while deployed.

Figure 1. Association between pre-,peri- and post-deployment characteristics and deployment-related PTSD. Reporting the lowest of all three deployment characteristics is the reference category for all odds ratios. These are the results from the multivariable regression which adjusted for gender, age, race, income, educational attainment, marital status, rank, most recent deployment location and total number of deployment-related traumatic events. Significance at $p<0.05$

Table 1. Characteristics of OHARNG study

Characteristics	Total (n=2616)		Been deployed (n=1668)	
	n	%	n	%
Gender				
Male	2228	85.2	1498	89.8
Female	388	14.8	170	10.2
Age				
17-24	878	33.6	297	17.8
25-34	848	32.4	656	39.3
35-44	634	24.2	524	31.4
45+	250	9.6	189	11.3
Race				
White	2295	87.7	1477	88.5
Black	195	7.5	114	6.8
Other	123	4.7	74	4.4
Income				
<=$60,000	1498	57.3	885	53.1
$60001+	1038	39.7	748	44.8
Education				
High School Graduate/GED or less	727	27.8	375	22.5
Some college or Technical Training	1234	47.2	824	49.4
College/Graduate Degree	655	25.0	469	28.1
Marital status				
Married	1227	46.9	954	57.2
Divorced/Separated/Widowed	252	9.6	189	11.3
Never Married	1134	43.4	522	31.3
Rank				
Officer	342	13.1	256	15.3
Enlisted, cadets, and civilian employees	2273	86.9	1411	84.6
Most recent deployment location				
Never deployed	939	35.9	0	0.0
Non-conflict area	872	33.3	872	52.3
Conflict area	793	30.3	793	47.5
Number of lifetime deployments				
0	939	35.9	0	0.0
1	817	31.2	817	49.0
2-3	682	26.1	682	40.9
4+	174	6.7	165	9.9
Total number of deployment-related traumatic				
0	374	14.3	374	22.4
1-5	588	22.5	588	35.3
6-11	337	12.9	337	20.2
12+	369	14.1	369	22.1

Note: Some percentages do not add up to 100 because of missing values

Table 2. Characteristics related to most recent deployment among those

	Median	Range	Alpha*
Training and Deployment Preparation	**21.0**	**4-25**	**0.7**
I had all the supplies and equipment needed to get my job done	4.0		
The equipment I was given functioned the way it was supposed to	5.0		
I received adequate training on how to use my equipment	5.0		
I was accurately informed about what to expect from the enemy	4.0		
I was accurately informed of what daily life would be like during my	4.0		
Unit Support	**29.0**	**7-35**	**0.8**
I felt a sense of camaraderie between myself and other soldiers in my unit	5.0		
Most people in my unit were trustworthy	4.0		
I could go to most people in my unit for help when I had a personal problem	4.0		
My commanding officers were interested in what I thought and how I felt	4.0		
I was impressed by the quality of leadership in my unit	4.0		
My superiors made a real attempt to treat me as a person	4.0		
I felt like my efforts really counted to the military	4.0		
Post-Deployment Support	**26.0**	**1-30**	**0.7**
The reception I received when I returned from my deployment made me	5.0		
The American people made me feel at home when I returned	5.0		
When I returned, people made me feel proud to have served my country in	5.0		
People at home just don't understand what I have been through while in the	2.0		
There are people to whom I can talk about my deployment experiences	5.0		
The people I work with respect the fact that I am a veteran	5.0		

*Cronbach's coefficient alpha (standardized)
**recoded, reverse order
All measures come from the Deployment, Risk and Resiliance Survey (DRRI)
Scores range from 1 (strongly disagree) to 5 (strongly agree)

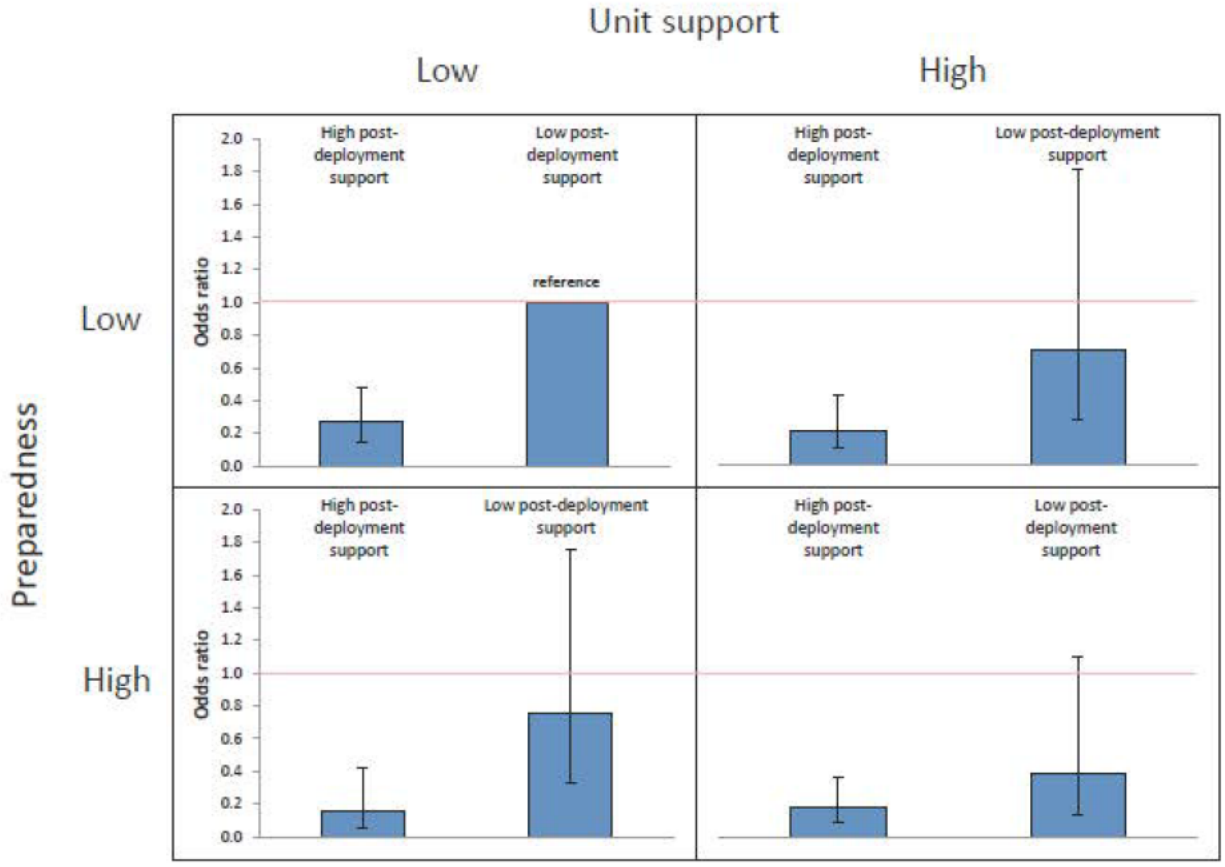
Table 3. Distribution of pre-, peri-, and post-deployment characteristic combinations and PTSD

Among those who have been deployed (n=1668)

Combination	Preparedness	Unit support	Post-deployment support	N	%	PTSD %*
1	High	High	High	421	25.2	4.7
2	High	High	Low	53	3.2	11.9
3	High	Low	High	189	11.3	4.2
4	High	Low	Low	65	3.9	16.4
5	Low	High	High	259	15.5	6.2
6	Low	Low	High	377	22.6	7.6
7	Low	High	Low	55	3.3	20.0
8	Low	Low	Low	249	14.9	22.4
					Overall	**9.6**

*Among those who experienced a traumatic event during their most recent deployment (n=1294)

Figure 1. Association between pre-, peri-, post-deployment factor combinations and deployment-related PTSD



Reporting low levels of all three factors is the reference category. Regression is adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced. Significance at $p<0.05$.

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PTSD Comorbidity and Suicidal Ideation Associated With PTSD within the Ohio Army National Guard

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ABSTRACT

Objective – To study the relation between PTSD psychiatric comorbidity and suicidal ideation in a representative sample of Ohio Army National Guard soldiers.

Methods – Using retrospective data collected on the telephone from a random sample of 2616 National Guard soldiers who enrolled in a 10-year longitudinal study (baseline data collected November 2008 – November 2009), we compared 1) the prevalence of other psychopathologies among those with DSM-IV diagnosed PTSD compared to those without PTSD and 2) the association between PTSD comorbidity and suicidal ideation (reporting thoughts of being better off dead or hurting themselves). All analyses were carried out using logistic regression.

Results –61.7% of guard members with PTSD in the last year had at least one other psychopathology; 20.2% has at least two other co-occurring conditions. The most common co-occurring psychopathology was depression. While those with PTSD overall were 5.4 (95%CI 3.8 – 7.5) times more likely to report suicidality than those without PTSD, those who had at least two additional conditions along with PTSD were 7.5 (95%CI 3.0 – 18.3) times more likely to report suicidal ideation at some point in their lifetime than those with PTSD alone.

Conclusion – Soldiers with PTSD were at increased risk for suicidality and among those with PTSD, those with at least 2 or more additional conditions were at the highest risk of suicidal ideation. Future research should address the mechanisms that contribute to multimorbidity in this population and the appropriate treatment methods for this high-risk group.

Introduction

Community-based assessments of mental illness suggest that people with a lifetime history of PTSD compared to those without are more likely to have another psychiatric condition and that few of those with PTSD have this condition alone (1-4). While the therapeutic challenges resulting from this degree of Axis I comorbidity indicate a need to further understand PTSD comorbidity, recent work also suggests that this co-occurrence may be associated with suicidality (5, 6).

In 2007, completed suicide was the second leading cause of death among those aged 25-34 and the third most common cause among those 15-24 in the United States (7). In military populations, the need to better understand the link between PTSD co-morbidity and suicidality, one of the greatest predictors of suicide (8), is particularly acute given the high prevalence of PTSD comorbidity (2, 9) and high rates of suicide (10-12). However, there is no consensus on the interrelation among PTSD, PTSD comorbidity, and suicidal ideation in military populations. A recent study by Guerra and colleagues examined Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans and found that while PTSD was associated with suicidality, the increase of comorbid conditions among those with PTSD was not associated with suicidality (9). In contrast, Jakupcak et al (13) examined treatment seeking OIF/OEF veterans and found that the risk of suicidality was higher among those with PTSD and at least two other psychiatric conditions compared to those with PTSD alone.

This lack of clarity suggests a need to understand the relation between PTSD, other psychiatric conditions and suicidal ideation. In particular, work is needed to examine this

relation in populations such as National Guard soldiers. Compared to their active-duty counterparts, reserve component soldiers often experience unique stressors that may negatively affect their mental health. For example, reserve forces are often deployed separately from their unit, maintain a civilian job while deployed and have a time-limited amount of health care insurance after deployment (14-16). Additionally, since the first Gulf War, reserve forces have played an ever-increasing role in combat, contributing approximately 27% of combat forces in OIF/OEF as of 2007 (17).

This paper uses the baseline data from a prospective cohort study of a random representative sample of the Ohio Army National Guard (OHARNG) to examine the prevalence of psychiatric comorbidity among those with PTSD and the relation between PTSD comorbidity and suicidal ideation.

METHODS

The National Guard Bureau and the institutional review boards of University Hospitals Case Medical Center, University of Toledo, University of Michigan, Ann Arbor Veterans Administration Medical Center, Columbia University, and the Office of Human Research Protections of the US Army Medical Research and Materiel Command approved the study protocol. Verbal informed consent was obtained from all participants.

Study Population and Sampling

This study population was drawn from all serving members of the OHARNG between July 2008 and February 2009 who had addresses listed with the guard (N=12,225). After sending

an alert letter to all guard members, 1,013 (8.3%) opted to not participate in the study. Eliminating those individuals who did not have a telephone number listed with the Guard (1,130, 10.1%) or incorrect numbers (3568, 31.8%), we had 6,514 (58.1%) possible participants. Of these, 187 (2.8%) were not eligible (e.g. too young or retired), 1,364 (20.9%) did not wish to participate, 31 (0.4%) were disqualified (e.g. did not speak English) and 2316 (35.6%) were not contacted before the cohort closed. Official enrollment (N=2616) and consent to participate in the study began in December 2008 and ended November 2009. Participants were compensated for their time.

Telephone interview and psychopathology assessments

The computer-assisted telephone interview was field tested in November 2008. All assessments of psychopathology included questions to assess Diagnostic and Statistical Manual of Mental Health Disorders (DSM-IV) criteria. Additionally, questions on timing were included to assess whether or not the symptoms were present in the past 30 days, past year or ever present in lifetime.

To assess self-perceived social support as well as collect information on traumatic events experienced during deployment we used an adapted form of the Deployment Risk and Resilience Inventory (DRRI) (18). We used a modified form of the Life Events Checklist from the Clinician-Administered PTSD Scale (CAPS) to collect the frequency of traumatic events throughout their lifetime (19, 20). The scale was modified to include additional questions used in other population-based studies to allow for comparisons (21).

To assess posttraumatic stress disorder (PTSD) we used the PTSD checklist civilian version (PCL-C) (22). PTSD symptoms were asked in relation to two traumas: their self-identified "worst" traumatic event from outside their most recent deployment and self-identified "worst" traumatic event experienced during their most recent deployment (19, 20, 23). To be diagnosed with PTSD a person had to experience criteria A1 and A2 (experiencing a traumatic event and intense fear, hopelessness and horror due to a trauma) as well as meet criterion B (at least 1 symptom of re-experiencing the trauma), criterion C (at least 3 symptom of avoidance of the trauma), criterion D (at least 2 symptoms of hyper-arousal), criterion E (duration of 1 month) and criterion F (significant impairment) (24). To have PTSD, a person had to meet all DSM-IV criteria related to one specific traumatic event and then either have PTSD from the traumatic event from their most recent deployment or PTSD from an event outside their most recent deployment.

We used the Patient Health Questionnaire-9 (PHQ-9) to assess any depressive disorder (25). To be diagnosed with depressive disorder (including major depressive disorder), an individual had to have at least 2 or more co-occurring symptoms on the PHQ-9, with at least one being depressed mood or anhedonia (25, 26).

To assess generalized anxiety disorder we used the GAD-7 (27). To be diagnosed with GAD a person had to have co-occurring symptoms with a score greater or equal to 10, have symptoms for at least 6 months and reported functional impairment (27).

The Mini International Neuropsychiatric Interview (MINI) was used to assess alcohol dependence (AD) and alcohol abuse (AA) (28). A lifetime history of AA occurred if they met

Criterion A (at least 1 symptom of maladaptive pattern of substance use leading to impairment or distress) and Criterion B (never met the classification for AD) (28). A lifetime history of AD occurred if they met at least 3 symptoms of maladaptive pattern of substance abuse leading to impairment or distress (28).

To have suicidal ideation in their lifetime, an individual had to report feeling that they had ever had thoughts of being better off dead or wanting to hurt themselves as determined from the PHQ-9 (25, 26).

Clinical interview

All psychopathology assessments were tested against a clinical reappraisal undertaken on a sub-sample of the study population (N=500) and we found the assessments reliable and valid in this population. Participants recruited for this sub-sample were re-interviewed using the full SCID and were compensated for their time. In our clinical reappraisal, we found the assessments had high specificity (ranging from 0.80 for alcohol abuse and 0.98 for generalized anxiety disorder) and were unlikely to classify those with a condition when they did not actually have the condition. The reliability estimates were similarly as high with the Cronbach's alpha ranging from 0.57 for AA to 0.95 for PTSD from the most recent deployment (M.T., unpublished data, March 2011).

Statistical analyses

We first compared the distribution of characteristics (e.g. gender, age, education) of our sample to the Ohio Army National Guard using two-tailed chi-square tests. We also described

the prevalence of individual psychopathologies (PTSD, any depressive disorder, GAD, AA, and AD) and the prevalence of no conditions, at least one condition and the co-occurrence of any of the conditions in 3 time frames: in the past month, in the past year and ever in their lifetime.

To answer our first question, we used logistic regressions to examine the association between PTSD and psychiatric comorbidity. We compared the prevalence of other conditions within the past year (co-occurring depression, GAD, AA, AD, no other diagnosis, one other diagnosis, two other diagnoses, then three other diagnoses) among those with PTSD and without PTSD. We then examined these comparisons separately for men and women (29).

To answer our main question, we used logistic regression to examine the relation between comorbid presentation of PTSD and suicidal ideation. We compared a lifetime history of suicidal ideation among those with and without PTSD. Then, separately among those with PTSD, we examined the association between co-morbid PTSD in the past year and suicidal ideation. The mode of survey administration resulted in the lack of collection on current alcohol use for 6% of participants. To determine how this may have affected our results, we ran sensitivity analyses assuming that these individuals all had an alcohol use disorder, that none did, or that a random proportion had an alcohol use disorder.

RESULTS

The characteristics of the baseline survey are described in **Table 1**. Similar to the OHARNG, our sample was predominantly male (85.2%) and white (87.7%). Our sample is slightly older than the OHARNG and approximately half are married. 64% had deployment experience with the majority having between 1 and 3 deployments. The past month, past year and lifetime

prevalence of mental disorders in the total baseline sample (N=2,616) is described in **Table 2**. The most common mental disorder in the past month and year was depression (6.4%, 14.0%) followed by PTSD (5.2%, 7.2%). The most common condition ever reported was AA (24.0%) relative to AD (23.5%), depression (21.4%), PTSD (9.5%) and GAD (2.9%). In the past month, the past year, and lifetime, 85.0%, 73.9%, and 42.0% had none of these disorders, respectively.

The 12-month psychiatric comorbidity in soldiers with and without PTSD and then separately for men and women is described in **Table 3**. In soldiers with PTSD, the most prevalent condition was depression (48.9%) followed by AD (17.0%) and GAD (16.0%). Compared to those without PTSD, GAD was 21.6 times more likely to occur in those with PTSD and depression was 7.6 times more likely. Whereas AD was 3.1 times more likely, AA was reported to the same extent in those with and without current PTSD. Those with PTSD were very unlikely to have no other lifetime disorder. When we stratified by gender, results were largely comparable but we did find that while, male soldiers with PTSD were 29.4 times more likely to have GAD compared to males who did not have PTSD, female soldiers were only 5.1 times more likely.

Table 4 and **Figure 1** display the association between a lifetime history of suicidal ideation and PTSD as well as co-morbid PTSD. Those with PTSD (as compared to those without) were 5.4 times more likely to have a history of suicidal ideation. Soldiers with PTSD and at least 2 comorbid conditions had 7.5 times greater odds of reporting suicidal ideation compared to those with PTSD only.

There were no statistically significant or meaningful differences in the associations reported here in the sensitivity analyses.

DISCUSSION

In a representative sample of OHARNG soldiers we found that those with PTSD were more likely to report suicidal ideation. Among those with PTSD, comorbidity with more than one disorder was associated with a higher risk for suicidal ideation. The general association between PTSD and suicidal ideation in National Guard soldiers adds to the growing evidence for this association in military populations (9, 13, 30). With respect to PTSD comorbidity, we found a specific association: among those with PTSD, those with two or more comorbid disorders were 7 times more likely to have ever reported suicidal ideation as compared to those with PTSD only. These results were consistent with work by Jakupcak et al (13) who found that among those with PTSD only those with two or more additional conditions were more likely to report suicidal ideation.

Considering the prevalence of PTSD multimorbidity, the relation between PTSD with multiple disorders and suicidal ideation has particular clinical import. Within the past year, 61.7% of soldiers with PTSD had at least one other condition and 20.2% had at least two other conditions, a level comparable to other military populations (2, 31). In comparison, two or more conditions were present in only 2.9% of those without PTSD. The prevalence of multiple conditions among those with PTSD and the increased association of this group with suicidal ideation highlight a singular subgroup of clinical and therapeutic concern.

We found that the most common co-occurring condition with PTSD was depression at 48.9% (46.2 % among men and 58.1% among women). While we used a definition of depression that was not limited to MDD alone several studies that examined MDD found a similarly high prevalence among those with PTSD (1, 32, 33). In military populations, 56% of Israeli soldiers seeking PTSD treatment recently had major depressive disorder (32) and 52% of a population-based sample of Australian Korean War veterans who had PTSD recently had major depressive disorder (33). The increased risk of depression among those with PTSD (7.6-fold over those without PTSD) was comparable to two population-based military studies including the Millennium Cohort (4 fold increase in men and 3 fold increase in women for MDD) and the National Vietnam Veterans Readjustment Survey (10 fold increase for MDE) (2, 34). The implications of this overlap have been reported in other studies which found higher severity of PTSD symptoms, poor self-reported quality of life, increased functional impairment and suicidal ideation among those with PTSD and depression compared to those with either condition alone (3, 33, 34). Future research should focus on persons with co-occurring mood-anxiety disorders as a particularly vulnerable group.

In our sample, the second most prevalent condition among those with PTSD was alcohol dependence. Often reported along with alcohol abuse as the most common co-occurring condition with PTSD (35), we found a high prevalence of alcohol dependence overall among those with PTSD (17.0%). This was primarily a concern among men with PTSD (20.0%). This prevalence of alcohol dependence was lower than that reported in the National Co-morbidity survey (men 52% and women 30%) but comparable to other military studies. Kulka et al (2) reported 22% of current alcohol abuse or dependence cases among those with PTSD in the

NVVRS and 39% of those with PTSD had some form of alcohol disorder (AA or AD) in the Vietnam Experiences Study (3). Compared to those without PTSD, those with PTSD were 3.1 times more likely to have had AD within the past year. In contrast to AD, we found no increase in the prevalence of AA among those with PTSD compared to the rest of the sample – AA was reported to the same extent regardless of mental health or gender. Further research is necessary to examine the association between alcohol dependence and PTSD as it may be a result of alcohol dependence preceding PTSD (3) but also may be a result of self-medication to deal with the symptoms of PTSD (3, 35, 36). Regardless, the therapeutic concerns for this overlap are similar to other conditions and include diagnostic concerns (3) as well as treatment implications (35-37).

Clinicians and family members should be alert to the clinical relevance of presentations of PTSD complicated by major depressive episodes and/or alcohol dependence. These two types of comorbidity appear to drive up the risk of suicidality more than seven-fold. It may be useful for clinicians to meet with family members at the time of the initial diagnostic assessment to inquire about these specific types of co-occurring illnesses.

This study has several limitations. We utilized retrospective and cross-sectional data. While we cannot tell if the psychopathologies predisposed suicidal ideation, the meta-analysis by Krysinska et al (30) reported evidence of both directional associations and future work will examine the longitudinal aspects of PTSD and suicidal ideation. In addition, these psychopathologies are self-reported which may lead to misdiagnosis given the retrospective and non-clinical nature of the data. Similar to the above limitation, longitudinal, clinical data

should be examined to see if these associations are robust. Regardless, in our validation testing using the clinical sub-sample, we found that the specificity of our assessment tools was high and therefore those who were classified as a probable case were likely to have the condition in question. Moreover, we found no evidence of specificity differences by gender (except for alcohol abuse), race or age for all mental health diagnoses (data available upon request) that argues that any misclassification would likely be non-differential and therefore any associations are likely a conservative estimate. Due to the time limitation of the telephone survey, we were unable to collect more mental health conditions and future work needs to examine the relation between PTSD comorbidity and suicidal ideation considering all Axis I and Axis II conditions. Given the robustness of sensitivity analysis, it is unlikely that the mode of survey administration had a substantial impact on absolute prevalences. However, it is possible that relative ranking of disorders with similar prevalences would be altered under different conditions.

The strengths of this work are due to the strong qualities of the Ohio Army National Guard Mental Health Initiative (OHARNG MHI). The study is a large, population-based sample of National Guard soldiers representative of OHARNG. Therefore, the conclusions may be generalizable to OHARNG and the Army National Guard.

Conclusion

In the OHARNG MHI the majority of current persons with PTSD also had at least one other psychiatric condition; 20% had multiple conditions. PTSD multimorbidity was strongly associated with a history of suicidal ideation. Future work should examine all Axis I and Axis II conditions in relation to PTSD comorbidity and suicide risk. In addition, work should investigate

the mechanisms linking PTSD with multiple conditions to suicidal ideation. Clinical implications include monitoring this high-risk group for indications of suicidal thoughts and the examination of effective methods of treatment for persons with PTSD multimorbidity.

Clinical Points:

- When depression or alcohol dependence accompanies PTSD, view this clinical presentation as being accompanied by high risk for suicidality.

- Always look for co-occurring depression and alcohol dependence in PTSD.

- These two co-occurring illness increase the risk of suicidality more than 7-fold.

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Table 1. Characteristics of the Ohio Army National Guard Study Participants*

	Total (N=2,616)		Ohio National Guard 2008		P-value
	n	%	N	%	
Gender					0.16
Male	2,228	85.2	9,293	86.2	
Female	388	14.8	1,485	13.8	
Age					<0.01
17-24	878	33.6	4,043	37.5	
25-34	848	32.5	3,746	34.8	
35-44	634	24.3	2,143	19.9	
45+	250	9.6	846	7.8	
Race					<0.01
White	2,295	87.8	9,512	88.3	
Black	195	7.5	1,083	10.0	
Other	123	4.7	183	1.7	
Income					
<=$60,000	1,498	59.1	-	-	
>$60,000	1,038	40.9	-	-	
Education					
High School Graduate/GED or less	727	27.8	-	-	
Some college or Technical Training	1,234	47.2	-	-	
College/Graduate Degree	655	25.0	-	-	
Marital status					<0.01
Married	1,227	47.0	4,154	38.5	
Divorced/Separated/Widowed	252	9.6	657	6.1	
Never Married	1,134	43.4	5,967	55.4	
Rank					<0.01
Officer	342	13.1	1,028	9.5	
Enlisted, cadets, and civilian	2,273	86.9	9,750	90.5	
Most recent deployment location					
Never deployed	939	36.1	-	-	
Non-conflict area	872	33.5	-	-	
Conflict area	793	30.5	-	-	
Number of lifetime deployments					
0-1	1,756	67.4	-	-	
2-3	682	26.2	-	-	
4+	169	6.5	-	-	
Total number of all traumatic events					
0	141	5.4	-	-	
1-5	887	33.9	-	-	
6-11	831	31.8	-	-	
12+	757	28.9	-	-	

***Some percentages will not add up to the total due to missing values. All tests were conducted using a two-tailed chi-square test.**

Table 2. Prevalence of Disorders in the Ohio Army National Guard Sample*

	Past month		Past Year		Ever in lifetime	
Conditions	N	%	n	%	N	%
PTSD	136	5.2	188	7.2	249	9.5
Depressive Disorder	167	6.4	365	14.0	560	21.4
Generalized Anxiety	45	1.7	53	2.0	75	2.9
Alcohol abuse	68	2.6	139	5.3	628	24.0
Alcohol dependence	91	3.5	183	7.0	615	23.5
No disorder	2224	85.0	1932	73.9	1099	42.0
At least one condition	304	11.6	496	19.0	1060	40.5
At least two conditions	88	3.4	188	7.2	457	17.5

* 141 (5.4%) people never had a trauma and were coded as never having PTSD for these statistics; 14 (0.5%) people refused or did not answer the PTSD symptoms and were coded as missing. 118 (4.5%) people reported never having drunk alcohol in their life and therefore, were coded as not having the condition. The combinations of conditions include those who have never had a trauma and therefore, not at risk for PTSD.

Table 3. Distribution of Mental Health Conditions Comparing Those With PTSD Within the Past Year to Those Who Did Not Have PTSD Within the Past Year

	PTSD N=188		No PTSD N=2414				
Overall (N=2602)	N	%	N	%	Odds	Upper	Lower CI
Conditions							
Depressive Disorder	92	48.9	269	11.1	7.6	5.6	10.4
Generalized Anxiety	30	16.0	21	0.9	21.6	12.1	38.7
Alcohol abuse	14	7.5	125	5.2	1.5	0.8	2.6
Alcohol dependence	32	17.0	149	6.2	3.1	2.1	4.7
Co-occurrence of other							
No other disorder	72	38.3	1922	79.6	0.2	0.1	0.2
One other condition	78	41.5	423	17.5	3.3	2.5	4.5
Two or more other	38	20.2	69	2.9	8.6	5.61	13.2
Men (N=2215)	N=145		N=2070				
Conditions	N	%	N	%			
Depressive Disorder	67	46.2	216	10.4	7.4	5.2	10.5
Generalized Anxiety	27	18.6	16	0.8	29.4	15.4	56.0
Alcohol abuse	12	8.3	114	5.5	1.5	0.8	2.9
Alcohol dependence	29	20.0	139	6.7	3.5	2.2	5.4
Co-occurrence of other							
No other disorder	56	38.6	1647	79.6	0.2	0.1	0.2
One other condition	55	37.9	364	17.6	2.9	2.0	4.1
Two or more other	34	23.5	59	2.9	10.4	6.6	16.6
Women (N=387)	N=43		N=344				
Conditions	N	%	N	%			
Depressive Disorder	25	58.1	53	15.4	7.6	3.9	14.9
Generalized Anxiety	3	7.0	5	1.5	5.1	1.2	22.1
Alcohol abuse	2	4.7	11	3.2	1.5	0.3	6.9
Alcohol dependence	3	7.0	10	2.9	2.5	0.7	9.5
Co-occurrence of other							
No other disorder	16	37.2	275	79.9	0.1	0.1	0.3
One other condition	23	53.5	59	17.2	5.6	2.9	10.8
Two or more other	4	9.3	10	2.9	3.5	1.03	11.4

Table 4 Lifetime History of Suicidal Ideation Among Those with Current PTSD and Those With PTSD Accompanied by Psychiatric Comorbidity

	History of suicide				
Association with current PTSD	N	%	Odds Ratio	Lower CI	Upper CI
No PTSD (N=2410)	200	8.3	reference	-	-
Current case of PTSD (n=187)	61	32.6	5.4	3.8	7.5
Association with PTSD					
Current PTSD only (N=72)	13	18.1	reference	-	-
Current PTSD+1 (N=78)	25	32.1	2.1	1.0	4.6
Current PTSD+2 or more (N=37)	23	62.2	7.5	3.0	18.3

The Ohio Army National Guard Mental Health Initiative: Data Collection, Sampling, Validation and Baseline Results

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Abstract

Objective

To explore prevalence of mental disorders and report reliability and validity findings from the baseline year in an ongoing study of the Ohio Army National Guard (OHARNG).

Study Design and Setting

2616 randomly selected OHARNG soldiers received hour-long structured telephone surveys including PTSD Checklist (PCL-C) and Patient Health Questionnaire – 9 (PHQ-9). A subset (N=500) participated in 2 hour clinical reappraisals, using the Clinician-Administered PTSD Scale (CAPS) and the SCID. The overall participation rate was 43%.

Results

The most commonly reported lifetime conditions for the telephone sample were: alcohol abuse 24%, alcohol dependence 23.5%, “any depressive disorder” 21.4%, and PTSD 9.6%. The telephone survey assessment for PTSD and for “any depressive disorder” were both highly specific [92% (SE 0.01), 83% (SE 0.02)] with moderate sensitivity [54% (SE 0.09), 51% (SE 0.05)]. Other psychopathologies assessed on the telephone included alcohol abuse [sensitivity 40%, (SE 0.04) and specificity 80% (SE 0.02)] and alcohol dependence [sensitivity, 60% (SE 0.05) and specificity 81% (SE 0.02)].

Conclusion

Validity and reliability statistics for telephone assessments indicated the methods performed well as research instruments. This ten year longitudinal study is expected to advance knowledge of the trajectories of post-deployment psychopathologies among OHARNG members.

Key Words: military, deployment, assessment, “posttraumatic stress disorder”, “depressive disorders”, “alcohol use disorders”
Word Count: 5009

The Ohio Army National Guard Mental Health Initiative: Data Collection, Sampling, Validation and Baseline Results

Introduction

The link between combat exposure and deployment stressors and psychopathologies, including posttraumatic stress disorder (PTSD), depression, anxiety, and substance abuse, among military populations is well documented [Killgore et al, 2008; Johnson et al, 2009]. Studies suggest that between 4.8-18% of military populations have had PTSD at some point in their lifetimes [Hoge et al, 2004; Vasterling et al, 2006; Dohrenwend et al, 2006; Iversen et al, 2009] compared with a 6.8-9.2% lifetime prevalence of PTSD for the general United States population [Kessler et al, 2005a, Breslau et al, 1998]. Similarly, studies suggest that military personnel have a greater lifetime prevalence of depression and generalized anxiety compared with the general population [Kulka et al, 1990; Hoge et al, 2004].

National Guard and Reserve forces are increasingly employed in combat zones [Vogt et al, 2008] and in 2007 comprised approximately 27% of the total troops deployed in Operation Iraqi Freedom (OIF) and in Operation Enduring Freedom (OEF) since 2001 [Sollinger 2007]. There is little agreement, however, on how deployment affects National Guard soldiers compared with their active duty counterparts. Some studies suggest that Guard soldiers may be at greater risk of deployment stressors and adverse mental health effects of war than active duty soldiers [Schell and Marshall, 2008; Smith et al, 2008]. For example, Guard soldiers deployed to conflict areas are exposed to the same combat experiences as active duty personnel but face different deployment stressors, including maintaining a civilian job while deployed and deploying with a unit with which they did not train [Vogt et al, 2008; Hotopf et al, 2006; La Bash et al, 2009]. Milliken et al [2007], using the Post-Deployment Health Re-Assessment (PDHRA), screened soldiers 6 months after their return from Iraq and found that, compared with active duty forces, twice as many reserve members required referral for mental health problems; family

readjustment and interpersonal conflicts were the major focuses of concern. By contrast, Black et al [2004] compared rates of current anxiety disorders of Gulf War veterans and non-deployed military personnel and found that the National Guard/Reserve subgroup was not any more or less likely to have a current anxiety disorder. Given the increased use of the National Guard overseas and the lack of understanding about how deployment affects this population, there is a need to closely document the attributes and mental health of this unique population over time.

The Ohio Army National Guard (OHARNG) Mental Health Initiative is a 10-year longitudinal study that annually monitors the factors associated with and course of mental health within a representative sample of service members from the Ohio Army National Guard. We report here: (a) the design and enrollment methods for the baseline cohort of 2616 Guard soldiers in the OHARNG Mental Health Initiative and methods planned for longitudinal follow-up as well as the recruitment and follow-up of an in-person clinical interview subsample; (b) prevalence of mental health conditions in the overall sample and in the in-person subsample, and (c) psychometrics of the structured assessment instruments being applied within the full cohort compared with those of the gold standard in-person assessments.

Study Population and Sampling

The target sample size was based on the following: (a) a realistic number of participants that we could enroll during the study period, (b) statistical power to detect clinically meaningful differences in the anticipated rates of sentinel mental illness between the groups of interest, and (c) statistical power to evaluate the validity of assessments conducted over the telephone compared with more detailed in-person clinician-administered interviews.

The study population of the OHARNG Mental Health Initiative is the OHARNG soldiers who served in the Guard between June 2008 and February 2009; the final study sample is 2616 randomly selected OHARNG soldiers (men and women 18 years or older of any

ethnicity capable of informed consent). OHARNG soldiers were invited to participate through a 2-stage process that included, first, a letter alerting soldiers of the study with an option to opt-out and, second, a phone call to obtain each soldier's consent to participate in a telephone interview.

During the first stage of enrollment, all soldiers enlisted in the OHARNG as of June 2008 (N=10,778) and those who enlisted between July 2008 and February 2009 (N=1792) received alert-letters directly from the OHARNG. The OHARNG excluded 345 individuals due to lack of a current address for a total of 12,225 alert-letters sent. The letter explained the study's purpose and consent procedure and included a pre-paid opt-out card. Of all guard soldiers who received the alert-letters, 8% (1013 soldiers) returned opt-out cards to the OHARNG. After 3 weeks, the OHARNG sent us contact information (name, telephone number and address) for the 11, 212 soldiers from whom opt-out cards had not been received.

During the second stage of enrollment, we contacted a subsample of possible participants to obtain informed consents for the telephone interviews. If the service member was deployed at the time of contact, information was requested on when the member would return and a call was scheduled. If after 10 telephone calls at different times of the day for 2 weeks contact was unsuccessful, a non-contact letter was sent to the possible participant's address to attempt to obtain a working telephone number.

The consent procedure and survey were piloted in November 2008 with 15 service members using a computer-assisted telephone interview (CATI). Official enrollment began in December 2008 and the consent procedure continued through the end of November 2009 when the desired sample size was reached. Participants were compensated for their time.

In-person clinical interviews

We also conducted in-person clinical interviews on a sub-sample of the telephone survey participants. At the end of the initial telephone interviews, a random sample of

participants was invited to participate in the in-depth clinical interview. Contact information for those agreeing was sent to the coordinating center and an interview scheduled. Participants were sent an appointment confirmation letter, consent form, and a questionnaire. On the date of the interview, masters or doctoral level clinicians (2 at University Hospitals Case Medical Center and 2 at University of Toledo) fully consented the participants and conducted the clinical interviews, meeting participants in their communities or locations of choice. Interviews averaged 2 hours and participants were compensated $50 per hour. Participants were included in the primary telephone sample regardless of whether they agreed to participate in the clinical interview subsample.

The in-person clinical interview baseline survey data were recorded on paper and double entered into the database at the University Hospitals Case Medical Center (Cleveland, OH). To assure the quality of the study data and documents in real-time, interviewers scanned and uploaded completed interviews and study teams shared information (ie, tracking logs, approved study documents) using a secure server. To reduce inter-rater differences, a taped interview was reviewed and rescored by all clinicians monthly to continually re-calibrate diagnostic methods of the in-person interviews. Most interviews took place in urban settings (77.6%) with Columbus, OH and Cleveland, OH being the most common. The reliability between the interviewers was high and ranged from 0.87 for posttraumatic stress disorder to 1.0 for major depressive disorder, alcohol disorder and generalized anxiety disorder (Brennan 1981; Cohen 1980; Feinstein 1990; Randolph 2005).

Future Survey Waves and Retention Measures

The OHARNG Mental Health Initiative will continue to conduct annual surveys for both the telephone and clinical interviews to obtain at least 10 time-points of data on each participant. OHARNG soldiers are a mobile population so retention measures include a website and bi-annual newsletters to inform participants about study progress. Midpoint between the annual telephone interviews, participants are sent a small stipend with a letter asking them to update their contact information.

Telephone Assessment Instruments

The OHARNG Mental Health Initiative CATI included questions on lifetime experiences, deployment and military experiences, current living situation, and past and present symptoms of psychopathology. Standardized survey instruments were used and modified if necessary to better address the population, adhere to the time constraint, and assess symptom timing, duration, and degree of impairment if applicable.

The Deployment Risk and Resilience Scale (DRRI) provided self-reported information on preparedness, unit support, perceived threat, combat experiences, concerns about home life, and social support upon returning home after the most recent deployment [King et al, 2006]. The DRRI was adapted to fit the allotted 60 minutes by excluding some segments of the original questionnaire (eg, exposure to biological agents) and eliminating several questions within sections.

Lifetime experience of traumatic events was collected with an expanded form of the Life Events Checklist from the Clinician Administered PTSD Scale (CAPS). Traumatic events experienced during participants' most recent deployment were collected from the DRRI [Blake et al, 1995; Weathers et al, 1999; King et al, 2006].

Psychopathologies were assessed using standardized and well-validated scales. Because the Guard includes soldiers who have never been deployed and former active duty soldiers who may have been deployed not only to OIF/OEF but to wars dating back to the Vietnam War, we examined the lifetime history of psychopathologies instead of only the past 6 months. The Posttraumatic Stress Disorder (PTSD) Checklist -- Civilian Version (PCL-C) [Blanchard et al, 1996] was used to collect PTSD symptoms in relation to participants' self-identified "worst" event experienced both outside and during their most recent deployments [Blake et al, 1995; Breslau et al, 1995; Weathers et al, 1999]. Questions were added to assess additional criteria for PTSD diagnosis as listed in the DSM-IV. Cases of psychopathology from the telephone survey were defined according to the standardized instrument algorithm as well as the DSM-IV criteria where

appropriate [American Psychiatric Association, 2000]. To ever have had the occurrence of PTSD within a lifetime, a person had to experience criterion A1/A2 (intense fear, hopelessness or horror due to a trauma); criterion B where at least 1 symptom of re-experiencing the trauma was reported; criterion C where at least 3 symptoms of avoidance of the trauma were reported; criterion D where at least 2 symptoms of increased arousal were reported; criterion E where symptoms lasted for at least 1 month; and criterion F where the symptoms caused significant impairment [American Psychiatric Association, 2000; Weathers et al, 1991].

To assess depressive episodes (both major and other forms of depression) and obtain occurrence of suicidal ideation ever in a lifetime, the Primary Care Evaluation of Mental Health Disorders Patient Health Questionnaire – 9 (PHQ-9) was used [Kroenke et al, 2001]. To have had a report of major depressive disorder (MDD) ever in a lifetime, the participant had to score $\geq$ 5 of 9 symptoms on the PHQ-9 and symptoms had to occur together within a 2-week period along with either depressed mood or anhedonia. In addition to MDD, we examined a more inclusive definition of depression defined by those who scored $\geq$ 2 out of 9 symptoms on the PHQ-9 and symptoms had to occur together in the same 2-week period with either depressed mood or anhedonia [Kroenke and Spitzer, 2002; Kroenke et al, 2001].

GAD was assessed with the Generalized Anxiety Disorder – 7 (GAD-7) [Spitzer et al, 2006]. A probable case of GAD was classified as a score $\geq$ 10 on the GAD-7, duration of symptoms at least 6 months, reported functional impairment, with symptoms grouped together [Spitzer et al, 2006]. Although we collected information on lifetime occurrence of GAD from the telephone interviews, only participants with symptoms within the last month were considered cases because the in-person clinical interview only captured current cases.

The Mini International Neuropsychiatric Interview (MINI) and DSM-IV criteria were used to assess alcohol dependence and alcohol abuse [Sheehan et al, 1998]. Participants

with alcohol abuse ever in lifetime met DSM-IV criterion 1 (at least 1 symptom of maladaptive pattern of substance use leading to clinically significant impairment or distress) and criterion 2 (symptoms never met the criteria for alcohol dependence) [American Psychiatric Association, 2000; Sheehan et al, 1998]. Those with alcohol dependence ever in lifetime met at least 3 symptoms of maladaptive pattern of alcohol use leading to clinically significant impairment or distress [American Psychiatric Association, 2000; Sheehan et al, 1998].

Suicidal ideation was assessed through the PHQ-9 question asking whether participants had thoughts of death or wanting to hurt themselves within the past 30 days.

In-person clinical interview Instruments

As in the telephone survey, the in-person clinical interview captured demographic information and used the DRRI to gather information on the stress experienced during participants' most recent deployments. The DRRI was included in the questionnaire sent prior to the in-person interview. The clinicians performed the second portion of the questionnaire in person and this survey included demographic questions along with mental health assessments. For the in-person clinical interview, the Structured Clinical Interview for DSM-IV (SCID) Axis I (non-patient version) was used to assess all Axis I disorders [First et al, 2002]. The CAPS was used to assess PTSD based on the "worst" event outside of their deployments as well as the "worst" event during any deployment; deployment events were not limited to the most recent deployment as with the telephone interview [Blake et al, 1995; Weathers et al, 1999]. The MINI Plus was used to assess current suicide risk [Sheehan et al, 1998].

The diagnosis of PTSD for the in-person clinical interview was based on the scoring rules outlined by Weathers, et al [1999] for the CAPS and followed the DSM-IV algorithm [American Psychiatric Association, 2000; Blake et al, 1995; Weathers et al, 1999]. To have a positive symptom for DSM-IV PTSD criteria B – D, a participant had to have a frequency ≥ 1 per symptom (at least once or twice in their lifetime) as well as a

symptom intensity of ≥ 2 (at least moderate -- distress clearly present but still manageable and some disruption of activities). To be diagnosed with PTSD a participant had to have criterion A1/A2 (intense fear, hopelessness or horror due to a trauma); criterion B where at least 1 symptom of re-experiencing the trauma was positive; criterion C where at least 3 symptoms of avoidance of the trauma were positive; criterion D where at least 2 symptoms of increased arousal were positive; criterion E where symptoms lasted for at least 1 month, and criterion F where the symptoms caused clinically significant impairment. The diagnoses for lifetime occurrence of MDD, alcohol abuse and alcohol dependence, and current occurrence of GAD were based on the SCID and DSM-IV criteria [American Psychiatric Association, 2000; First et al, 2002].

Suicidal ideation was evaluated using MINI Plus [Sheehan et al, 1998]. A positive response was a score of at least 'moderately' (9 points or greater) on the question of suicide attempts in the past 6 months.

Statistical Methods

First, the distribution of demographic characteristics (eg, age, gender, and education) from those in the primary baseline sample (telephone survey (N=2616)) and those later selected to participate in the in-person clinical interview subsample (N=500) was compared using chi-square tests. As this test was performed to determine if the in-person sample was representative of the telephone sample, all data for this analysis came from the telephone assessment.

Second, the lifetime prevalence of each psychopathology – PTSD, MDD, other forms of depression, GAD (past 30 days), alcohol abuse, alcohol dependence, and suicidal ideation – was described for the baseline sample (N=2616) and those later selected for the clinical interview subsample (N=500). Lifetime prevalence was defined as ever having the disorder.

Third, we examined the reliability and validity of the telephone assessments compared with the in-person clinical interview. Using the 500 participants who were in both samples, we applied 3 tests of reliability and 4 tests of validity following methods presented by Kessler et al [2005b] in the National Co-morbidity Survey Replication (NCS-R). The first reliability test calculated a kappa statistic (1 -- perfect agreement and 0 -- no agreement) between diagnoses according to the telephone interview and clinical interview to evaluate the extent of agreement on each participant's classification beyond chance alone. We then examined the McNemar's statistic, a test of marginal heterogeneity that appraises whether the 2 tests used different core criteria. The final measure of reliability was Cronbach's alpha applied to the telephone survey questions to examine the internal consistency of the measurement items that comprised the diagnoses.

To assess validity of the telephone assessments, we used the in-person clinical interview as the gold standard. We calculated the sensitivity (true positives correctly classified by the telephone assessment/all true cases), specificity (true negatives correctly classified by the telephone assessment/all true non-cases), positive predictive value (PPV, true positives correctly classified by the telephone assessment/all positive cases defined by the telephone assessment), and negative predictive value (NPV, true negative cases correctly classified by the telephone assessment/all negative cases defined by the telephone assessment). Next, using the overall continuous score from each of the scales (PTSD, depression, GAD, alcohol abuse, alcohol dependence), we examined the area under the curve (AUC) as a measure of overall accuracy based on the continuous score of the telephone assessment and the gold standard of the clinical interview. All standard errors reported were asymptotic.

Finally, to test whether disease misclassification between the telephone and the clinical interview was differential depending on participant characteristics, we calculated the sensitivity and specificity for PTSD, MDD, GAD, alcohol abuse, alcohol dependence, and suicidal ideation within men and women, participants < 35 and ≥ 35 years of age,

and white and non-white categories. Confidence intervals (CI) for these statistics were asymptotic unless the sample size was ≤ 50, in which case exact CIs were reported.

Results

Of the 11,212 soldiers for whom contact information was received from the Guard, 10.1% (1130) were excluded because they did not have a listed telephone number or address and 31.8% (3568) were excluded due to non-functioning or incorrect numbers and not returning a non-contact letter (Figure 1). Of the 6514 possible participants with working numbers (58.1% of the original telephone number list), only 20.9% (1364) declined to participate; 2.9% (187) were retired and therefore ineligible, and 36.0% (2347) were not included because they were not enrolled before the baseline cohort closed in November 2009 (n=2316) or were disqualified for other reasons (n = 31) (eg, did not speak English, hearing problems, or deceased). Overall, our participation rate was 43.2% calculated as those who completed the telephone survey plus those who would have consented had they not been retired divided by all of the working numbers minus those disqualified for other reasons.

No significant differences in the distribution of demographic characteristics were found between the telephone and in-person samples (Table 1). The majority of participants were male (85.2% telephone and 88.0% in-person), white (87.7% telephone and 88.8% in-person), and non-officers, including enlisted soldiers, cadets, or civilian employees (86.9% telephone and 88.8% in-person). The majority had had some form of deployment/mobilization experience (35.9% never deployed in telephone sample and 34.6% never deployed in in-person sample); 30.3% of the telephone and 29.4% of the in-person samples were most recently deployed to a conflict setting.

Table 2 lists the prevalence of each condition in the telephone sample. The most commonly reported lifetime condition for both the telephone sample and clinical interview subsample was alcohol abuse, 24.0% and 28.2% (N=141) respectively. Alcohol dependence was the next most common condition, 23.5% in the telephone

sample and 20.4% (N=102) in the subsample. According to the PHQ-9, 10.3 % of the telephone sample was classified as having MDD at some point in their lives and 21.4% as having some form of depression (MDD including other forms of depression). In comparison, according to the SCID, 22.4% (N=112) of the clinical interview subsample was diagnosed as having MDD at some point in their lives. Deployment-related PTSD was reported by 7.4% of the telephone sample and 6.1% (N=14) of the clinical interview subsample; non-deployment related PTSD prevalences were 6.0% and 3.4% (N=15) respectively. For PTSD ever in lifetime, the prevalence was 9.6% for the telephone sample and 6.0% (N=28) for the subsample. GAD and suicide risk were rarely reported, 1.7% and 1.9% respectively in the telephone sample.

For the validity measures (Table 3), specificity and NPV were higher than sensitivity and PPV for all diagnoses. The telephone diagnosis was most sensitive for alcohol dependence (0.60) and least sensitive for GAD (0.04). The telephone diagnosis was most specific for GAD (0.98) and least specific for alcohol abuse (0.80). The PPV varied but was moderate to low for all conditions, the highest being for MDD (0.64). The NPV was very high for all conditions, the lowest being for alcohol abuse (0.77). Reliability statistical testing results (Table 3) produced relatively moderate kappa values, for example, 0.34 for PTSD ever in lifetime and 0.37 for alcohol dependence. McNemar's test rejected the null hypothesis of no marginal heterogeneity between the telephone sample and clinical interview subsample for PTSD, MDD, GAD, and alcohol dependence. The measure of reliability and internal agreement for the telephone psychopathologies reported by Cronbach's alpha ranged from 0.95 for deployment-related PTSD to 0.57 for alcohol abuse.

The sensitivity and specificity of the telephone diagnoses stratified by gender, age, and race across the psychopathologies showed no misclassification related to these demographic variables (Table 4). There was evidence of misclassification for alcohol abuse by gender; the sensitivity and specificity for alcohol abuse was higher for men than women.

Discussion

Baseline findings are largely comparable to previous work in other military samples but also provide evidence for important differences between National Guard and regular forces.

In both the clinical and telephone survey baseline samples, the prevalence of alcohol disorders documented was notably higher compared with the general population as reported in the NCS-R sample [Kessler et al, 2005b]. Although not directly comparable with those of Kessler et al [2005b] due to varying assessment methods, our telephone survey results of a lifetime prevalence of 24.0% for alcohol abuse and of 23.5% for alcohol dependence were nearly double the 13.2% lifetime prevalence alcohol abuse and 5 times greater than the 5.4% lifetime prevalence for alcohol dependence in the general population [Kessler et al, 2005b]. The Millennium Cohort [Riddle et al, 2007] study of a large military sample using the PHQ similarly reported a higher 12-month prevalence of alcohol abuse than that found in the NCS-R sample [Kessler et al, 2005b]. This result is supported by several other studies that found a greater prevalence of alcohol abuse or disorder among military personnel relative to comparable civilian populations [Kulka et al, 1990, Bray et al, 1991, Fear et al, 2007]. In studies that have focused on reserve forces, alcohol abuse was similarly reported as the most prevalent psychopathology and, therefore, an area of necessary intervention and future research [Iversen et al, 2009, Riddle et al, 2007]. It is possible that these high prevalences reflect binge-drinking and heavy alcohol use at times of higher stress, such as during post-deployment periods that Guard and Reserve soldiers face [Fear et al, 2007, Jacobson et al, 2008]. Considering the high prevalence of alcohol disorders in our sample and recent reports of increasing trends in alcohol disorders in the military [Bray et al, 2006], future work will examine the lifetime experiences and factors associated with alcohol disorders specific to National Guard members, including deployment and combat experiences over time.

Second to alcohol disorders was the 10.3% prevalence of MDD at some point in soldiers' lifetimes in the baseline telephone sample. This lifetime prevalence is comparable with, if a bit lower than the 16.6% reported in the general population, although this is a substantially younger population and assessment methods differ [Kessler et al, 2005b]. Relative to other psychopathologies, our findings are supported by those reported for the Millennium Cohort in which MDD was the second most prevalent condition among the Reserve/Guard sample [Riddle et al, 2007] as well as a UK reserve sample [Iversen et al, 2009]. In combination with the high prevalence of alcohol disorders, the prevalence of MDD in the Guard population suggests that future work should focus on understanding the burden of substance abuse and mood disorders in this group.

The lifetime prevalence of PTSD was 9.6% and comparable with the range (6.8% - 9.2%) of lifetime PTSD prevalences reported in the general population [Kessler et al, 2005b; Breslau et al, 1998]. In contrast, other military samples have reported a higher prevalence of PTSD than in the general population, perhaps due to inclusion of active duty personnel as well as Guard and reserve forces [Kulka et al, 1990, Dohrenwend et al, 2006]. While we cannot directly compare these military cohorts to our sample, our findings may suggest a greater level of resilience to PTSD among Ohio Army National Guard soldiers than compared to other reserve forces.

Both GAD and suicidal ideation were rarely reported in our study. The GAD prevalence within the past month was 1.7%, a finding supported by the 3.1% past 12-month GAD prevalence in the NCS-R sample as well as the 1.6% past 6-month GAD prevalence in the Reserve/Guard subset in the Millennium cohort [Kessler et al, 2005b; Riddle et al, 2007]. GAD prevalences were collected over different periods, but regardless, the prevalence of GAD in these studies was low. The infrequency of suicidal ideation is supported by findings for the UK reservist cohort [Iversen et al, 2009]. However, concern remains high over reported increasing rates of suicide in both regular Army and Guard forces. In 2008, the completed suicide rate of 20.2 per 100,000 in active-duty

Army was expected to exceed the suicide rate among similar-aged civilians, which was most recently recorded in 2005 by the Centers for Disease Control and Prevention as 19.5 per 100,000 [Kuehn, 2009].

Overall, the validity and reliability statistics for the telephone psychopathology assessment indicated that the methods performed well as instruments for research on PTSD, depression, alcohol abuse, and suicide risk.

All structured screening instruments had high specificity, meaning very few participants were classified as having conditions they did not actually have. In estimating population prevalences, high specificity is more critical for accuracy than is sensitivity, whereas high sensitivity is more important in a clinical setting (Terhakopian et al, 2008). Therefore, based on the high specificity and low PPV of the telephone assessments, this approach should not be used to diagnose individual conditions. Given that the clinical interview was done on a subsample of the population-based telephone survey, we would expect the PPV to be lower than for clinical interviews done in primary care settings. The PPV is sensitive to the prevalence of the condition in the sample, so studies of veterans in primary care settings, such as Bliese et al (2008), would be expected to find the PCL-C performs better for individual diagnosis. Finally, the sensitivity and specificity for nearly all of the psychopathology diagnoses in the telephone sample did not differ by demographic group, suggesting there was not differential misclassification. This implies that any misdiagnoses for these conditions are random, rather than based on participant characteristics. Given non-differential misclassification, it is assumed that future analyses are more likely to have conservative estimates of effect taking into account possible misclassification bias. That said, there was some suggestion that alcohol abuse may be misclassified by gender; women were less likely to be correctly diagnosed than men. This may lead to differential misclassification and sensitivity analyses will be performed when effect sizes are to be examined.

The telephone assessments had moderate to high levels of reliability across the three measures assessed: kappa, coefficient alpha, and McNemar's test. The kappa statistics were fair for suicide risk and all diagnoses with the exception of GAD, suggesting that agreement between the telephone and clinical diagnoses was not due to chance, other than possibly for GAD (Table 3). However, the statistics for GAD showed good internal consistency. Spitzer [2006] reported a Cronbach alpha of 0.92 for his GAD validation study, higher than ours (0.72), but still comparable. The other Cronbach alphas in Table 3 also indicate consistency and that the index questions represented the same underlying construct. Blanchard et al [1996] examined the reliability of the PCL-C among female trauma victims and found Cronbach alphas of 0.93 for the PTSD scale, similar to our results.

Lastly, for McNemar's test of reliability, the finding that psychopathology diagnostic results for several conditions did not reject the null of marginal homogeneity suggested that the telephone assessment and clinical interview were using the same core criteria for diagnoses of alcohol abuse, any depressive disorder, and suicide risk. In comparison, PTSD, MDD, GAD, and alcohol dependence tests rejected the null of marginal homogeneity, suggesting some differences in the core diagnostic criteria between the telephone and the clinical interview subsample. In light of the facts that the MDD diagnosed on the telephone appeared to be different than that diagnosed during the clinical interview and the prevalence of MDD in the telephone sample was low, we compared general depression (including MDD and other forms of depression) prevalence from the telephone sample with MDD in the clinical interview subsample. We found these two diagnostic tests were more reliable and appeared to use the same diagnostic criteria. It is of note that in the NCS-R, Kessler, et al [2005b] reported comparable reliability statistics for these psychopathologies. However, Kessler found core diagnostic differences by McNemar's test between the World Health Organization Composite International Diagnostic Interview (CIDI) and the SCID for PTSD, MDD, alcohol abuse, and alcohol dependence, whereas we found differences for PTSD, MDD, GAD, and alcohol dependence.

Reliability statistics are population dependent, so it is important to understand that the findings from this military population study may not be generalized to other populations. It is also possible that some of the screening baseline findings are overestimates, given the relatively low prevalence of PTSD and GAD in the underlying population [Golding et al, 2009]. The current study is also limited by the small percentage of women and other minorities; however, the demographics of our sample very closely mirror the overall demographics of the OHARNG.

Conclusion

The OHARNG Mental Health Initiative will continue to follow the OHARNG members over 10 years. This longitudinal study is expected to advance knowledge of the trajectories of post-deployment psychopathologies and facilitate enhancements in access to care and treatment of behavioral health issues among National Guard soldiers.

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Table and Figure Legends

Figure 1: 2616 Completed Surveys

Table 1: Participant Characteristics: Telephone Interview Sample Compared with Clinical Interview Subsample

Table 2: Prevalence of Mental Health Conditions for Telephone Interview Sample

Table 3: Reliability and Validity Statistics for the Telephone Assessment Sample by Psychopathology

Table 4: Sensitivity and specificity of psychopathology diagnoses by telephone within specific demographic groups

Table 4 (continued): Sensitivity and specificity of psychopathology diagnoses by telephone within specific demographic groups (continued)

Ohio Army National Guard Mental Health Initiative

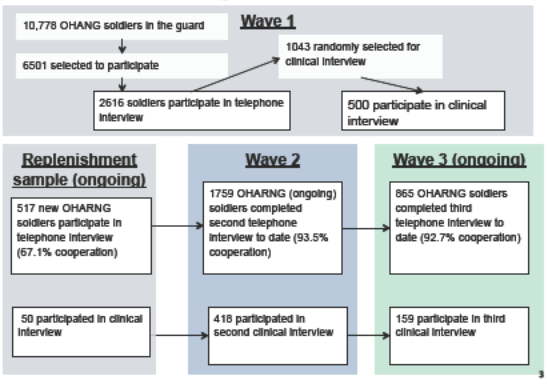
O•N•G
OHIO NATIONAL GUARD STUDY

Outline

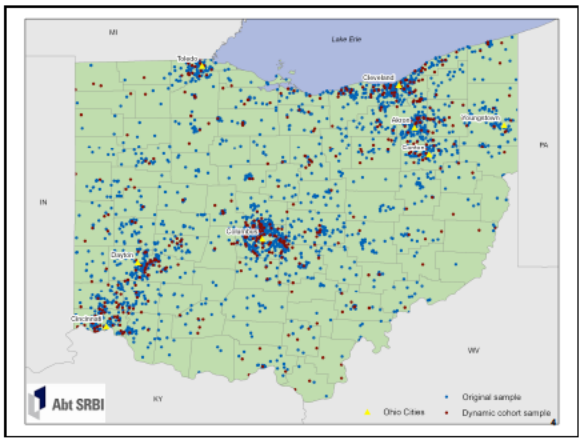
- Study details
- Pre-deployment/civilian mental health
- Civilian experiences
- Deployment experiences
- Relations between civilian/deployment experiences and axis I disorders
- A few specific questions

2

Participation flow chart



3


MI
Lake Erie
Toledo
Cleveland
Akron
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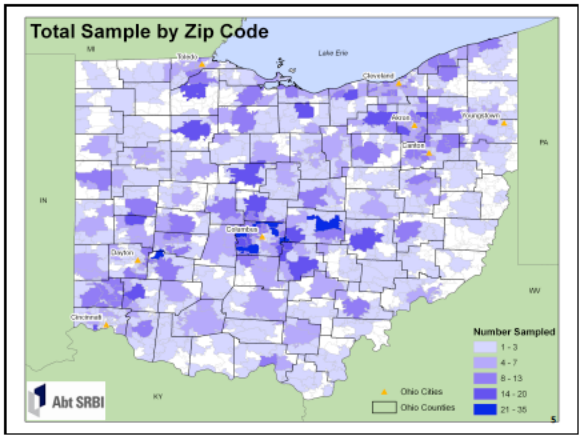
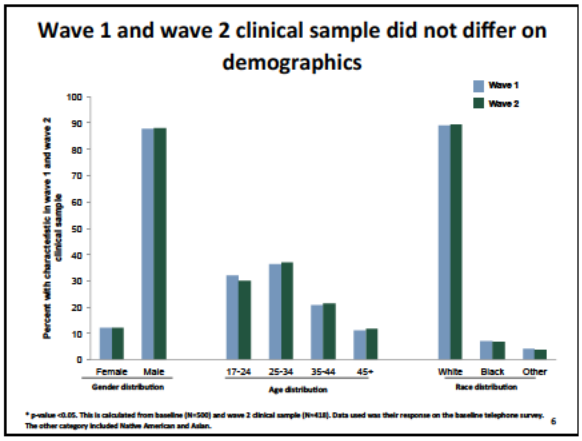
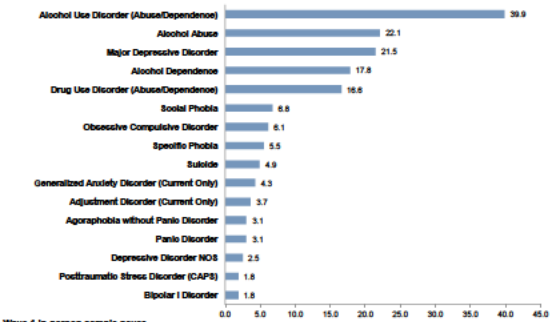
IN
Columbus
Dayton
Cincinnati
WV
KY
Abt SRBI
Original sample
Ohio Cities
Dynamic cohort sample
4


Total Sample by Zip Code
MI
Lake Erie
Toledo
Cleveland
Akron
Youngstown
Canton
PA
IN
Columbus
Dayton
Cincinnati
WV
KY
Abt SRBI
Number Sampled
1 - 3
4 - 7
8 - 13
14 - 20
21 - 35
Ohio Cities
Ohio Counties
5


Wave 1 and wave 2 clinical sample did not differ on demographics
Wave 1
Wave 2
Percent with characteristic in wave 1 and wave 2 clinical sample
100
90
80
70
60
50
40
30
20
10
0
Female
Male
Gender distribution
17-24
25-34
35-44
45+
Age distribution
White
Black
Other
Race distribution
* p-value <0.05. This is calculated from baseline (N=500) and wave 2 clinical sample (N=418). Data used was their response on the baseline telephone survey. The other category included Native American and Asian.
6

What does a soldier's mental health look like before deployment?

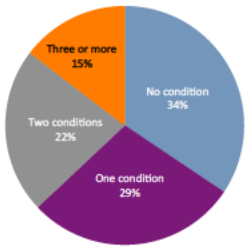
Lifetime mental health (among those who have never deployed)



Wave 1 in-person sample never deployed N=183

8

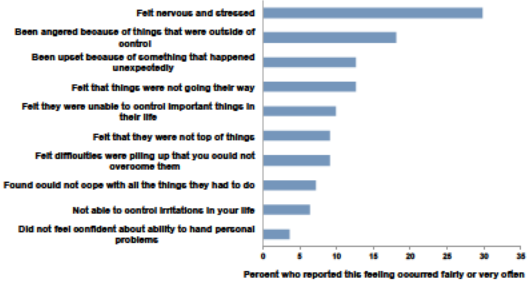
66% of the Wave 1 sample have had at least one condition ever in their lifetime (N=500)



According to the NCS-R 46.4% of the general US population have had at least one condition and 17.3% have had three or more conditions. These estimates are based on the in-person interview using the SCID, conditions include alcohol disorder, major depressive disorder, drug use disorder, social phobia, PTSD, generalized anxiety disorder, specific phobia, panic disorder, obsessive compulsive disorder, agoraphobia with a history of panic disorder, adjustment disorder, bipolar I and II, depressive disorder NOS, dysthemic disorder, anxiety disorder NOS, eating disorder, substance-induced mood disorder, body dysmorphic disorder, hypochondriasis, psychotic symptoms.

9

Perceived stress (among those who have never deployed)

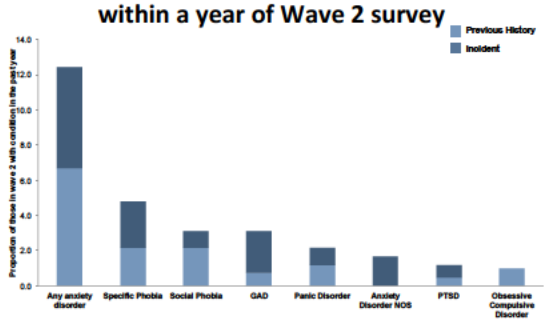


Wave 2 in-person sample among those never deployed (N=111). These come from the Perceived Stress Scale. These questions were rated on a 5-point scale with "never", "almost never", "sometimes", "fairly often", and "very often". Reported here are the percent of respondents who said it occurred "fairly" or "very" often. Cohen et al (1988) Perceived stress in a probability sample in the United States. In Spacapan S, Oskamp S, eds. *The social psychology of health*. Newbury Park: Sage,1988.

10

What are the prevalences of Axis I conditions in wave 2?

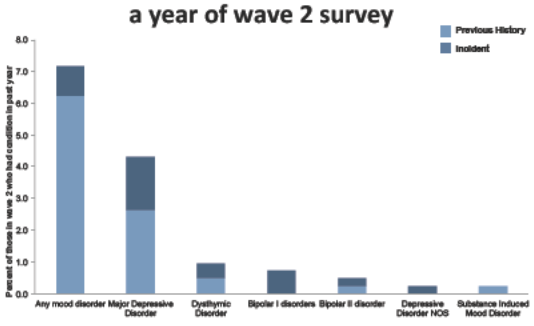
13% of soldiers had an anxiety disorder within a year of Wave 2 survey



Wave 2 in-person (N=418). Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a clinician-administered PTSD scale. Journal of Traumatic Stress 1995;8. First MB, Spitzer RL, Gibbon M, Williams JBW editors. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York: Biometrics Research, New York State Psychiatric Institute; 2002.

12

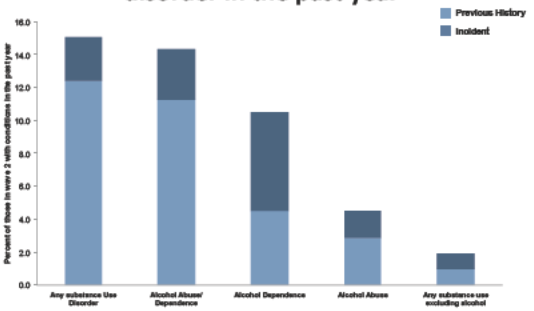
7% of soldiers had a mood disorder within a year of wave 2 survey



Wave 2 in-person (N=18). First MB, Spitzer RL, Gibbon M, Williams JBW editors. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York: Biometrics Research, New York State Psychiatric Institute; 2002.

13

14% of soldiers have had a substance abuse disorder in the past year



Wave 2 in-person (N=18). First MB, Spitzer RL, Gibbon M, Williams JBW editors. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York: Biometrics Research, New York State Psychiatric Institute; 2002.

14

Circumstances that may affect Axis I conditions in citizen soldiers

Circumstances outside deployment
- Childhood events
- Civilian job status
- Family history
- Legal history
- Civilian events

Circumstances during deployment
- Deployment experience
- Deployment conditions

Mental Health
Personal Wellbeing
Anxiety disorders
Mood disorders
Alcohol disorders
Substance use disorders
Somatoform disorders
Eating disorders
Adjustment disorders
Suicide

15

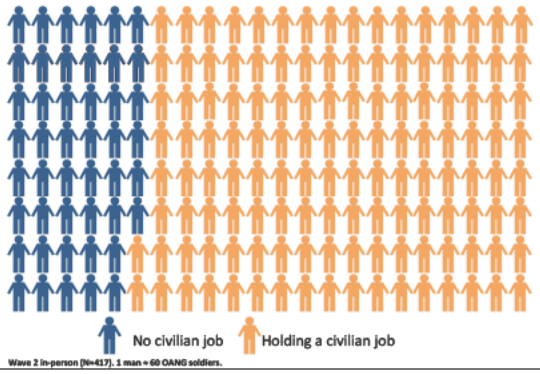
Civilian circumstances that contribute to Axis I conditions

Circumstances outside deployment

- Childhood events
- Civilian job status
- Family history
- Legal history
- Civilian events

16

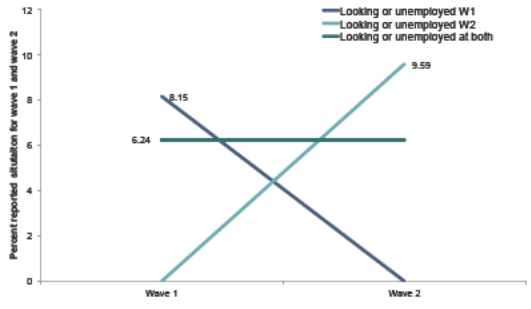
73.6% of the sample currently hold civilian jobs



Wave 2 in-person (N=417). 1 man = 60 OANG soldiers.

17

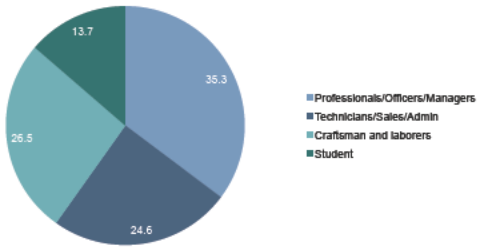
10% of those in Wave 2 started looking for work or were recently unemployed in the past year



Calculated from those who answered both wave 1 and wave 2 (N=417)

18

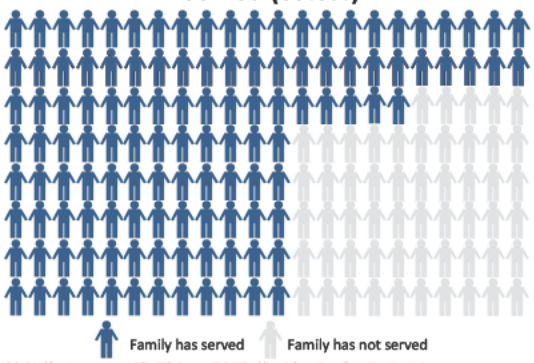
13.7% of soldiers in wave 2 said they are students in their civilian life



Calculated from those who answered both wave 1 and wave 2 (N=417)

19

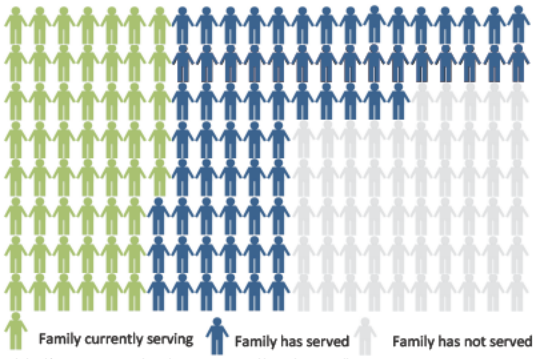
Most soldiers have family members who have served (69.5%)



Calculated from in-person wave 2 (N=418). 1 man = 60 OANG soldiers. Information collected is unique to in-person survey.

20

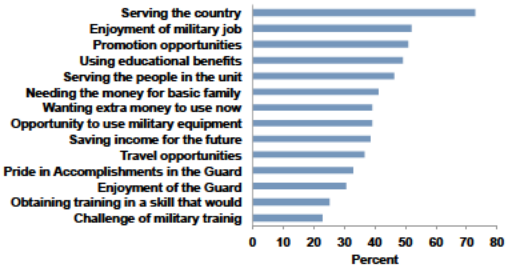
21% have family members currently serving



Calculated from in-person wave 2 (N=418). 1 man = 60 OANG soldiers. Information collected is unique to in-person survey.

21

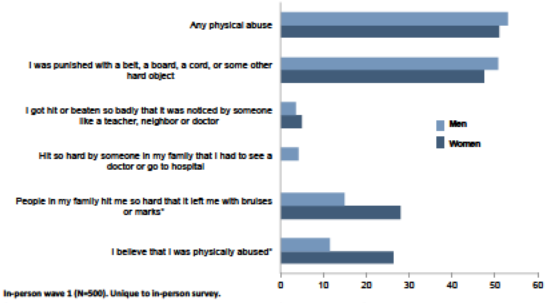
Most common reason people stay in the guard is to serve their country



Wave 2 clinical sample N=418. Unique to in-person sample.
Why stayed in the Guard - 2000 Reserve Component Survey:
Simmons RO, D'Amato-Neff AL, Ferro O, & Lappin BM (2002, July). 2000 Survey of reserve component personnel: Administration, datasets, and codebook. DMDC Report No. 2002-004. VA, Defense Manpower Data Center

22

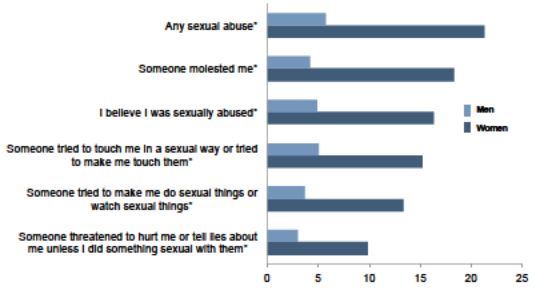
In childhood, 52% of soldiers reported being hit as a child



In-person wave 1 (N=500). Unique to in-person survey.
*p<0.05. These values are from the Childhood Trauma Questionnaire (Bernstein et al. 1996). Each variable is determined on a 5 – point scale from "never true", "rarely true", "sometimes true", "often true" and "very often true". Presented are the percentages of those who reported "sometimes true" to "very often true".

23

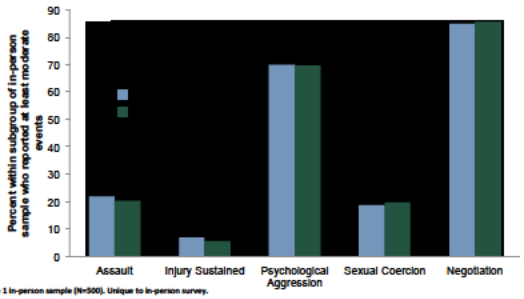
Women were more likely than men to report sexual abuse as a child



In-person sample Wave 1 N=500. Unique to the in-person survey.
*p<0.05. These values are from the Childhood Trauma Questionnaire (Bernstein et al. 1996. Each variable is determined on a 5 – point scale from "never true", "rarely true", "sometimes true", "often true" and "very often true". Presented are the percentages of those who reported "sometimes true" to "very often true".

24

In the year before Wave 1 survey, participants reported less domestic violence than in the general population

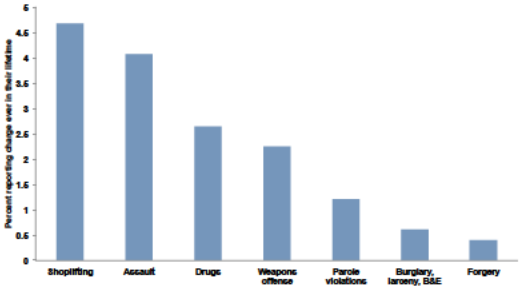


Wave 1 in-person sample (N=500). Unique to in-person survey.

*p-value<0.05. These values are from the Conflict Tactics Scale (Straus et al. 1996) from the baseline sample of the in-person surveys (N=500). The 78 question scale is based upon 5 subscales, response options are "once", "twice", "3-5 times", "6-10 times", "11-20 times", "more than 20 times", "not in the past year, but happened before", and "never happened". Presented are the percentages of those who reported one or more instances of the acts in each subscale during the past year. Negotiations are considered actions taken in order to settle a disagreement.

25

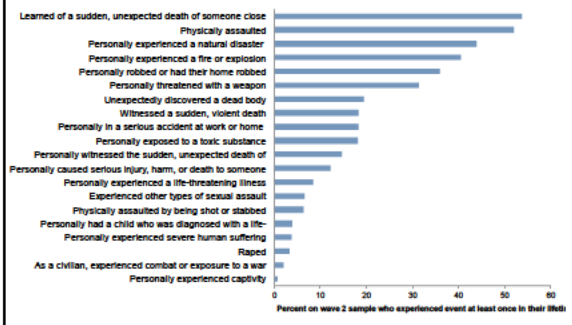
17.9% of soldiers have been charged in the past and 55% of those led to convictions



Calculated from in-person baseline (N=500).

26

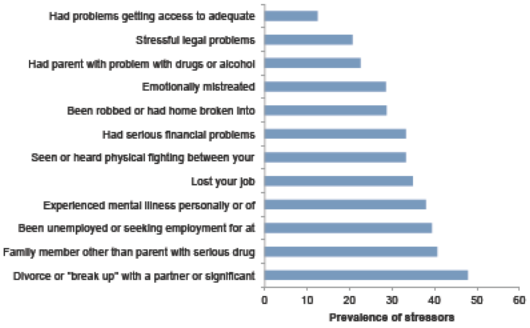
Most common type of traumatic event that occurred in lifetime was sudden death of someone close (N=417)



Wave 2 in-person sample. N=417. Note this is the the report of events that have been reported at least once and does not include multiple accounts of a single type of event. This is not an exhaustive list.

27

OHARNG members are dealing with civilian stressors in addition to their deployment-related experiences



Wave 1 telephone sample N=2616

28

How does civilian life affect the prevalence of Axis I conditions?

Circumstances outside deployment

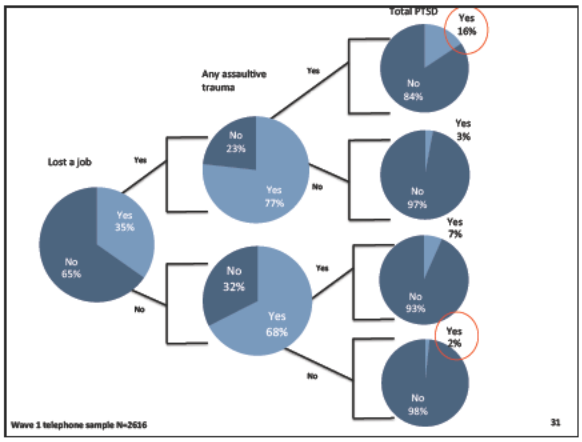
- Childhood events
- Civilian job status
- Family history
- Legal history
- Civilian events

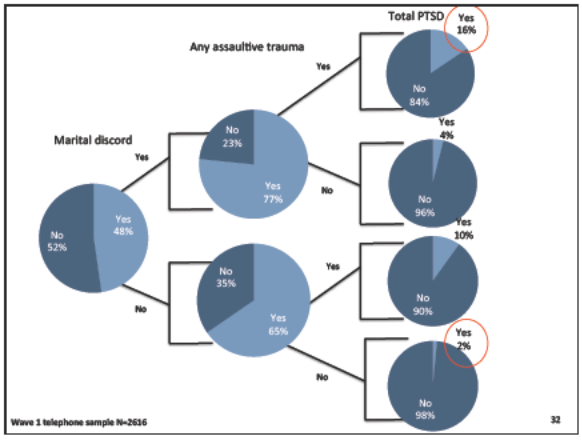
Mental Health

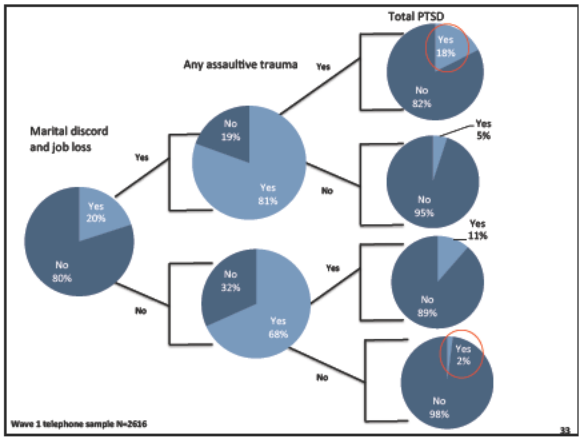
Personal Wellbeing
Anxiety disorders
Mood disorders
Alcohol disorders
Substance use disorders
Somatoform disorders
Eating disorders
Adjustment disorders
Suicide

29

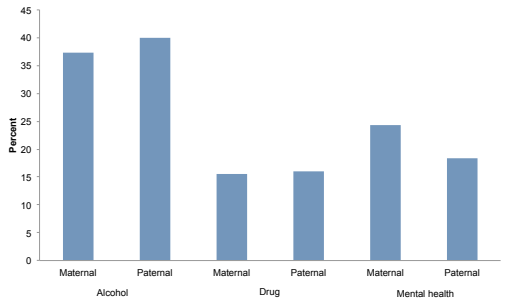
Guards who experience both a stressor and trauma have an 8 fold increase of PTSD compared to those without either


Total PTSD
Yes 16%
No 84%
Any assaultive trauma
Yes
No 23%
Yes 77%
Lost a job
Yes
Yes 35%
No 65%
No
Yes 3%
No 97%
No
No 32%
Yes 68%
Yes 7%
No 93%
Yes 2%
No 98%
Wave 1 telephone sample N=2616
31


Total PTSD
Yes 16%
No 84%
Any assaultive trauma
Yes
No 23%
Yes 77%
Marital discord
Yes
Yes 48%
No 52%
No
Yes 4%
No 96%
No
No 35%
Yes 65%
Yes 10%
No 90%
Yes 2%
No 98%
Wave 1 telephone sample N=2616
32


Total PTSD
Yes 18%
No 82%
Any assaultive trauma
Yes
No 19%
Yes 81%
Marital discord and job loss
Yes
Yes 20%
No 80%
No
Yes 5%
No 95%
No
No 32%
Yes 68%
Yes 11%
No 89%
Yes 2%
No 98%
Wave 1 telephone sample N=2616
33

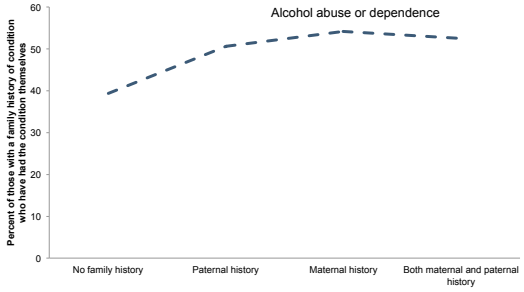
Family history of mental health problems



Wave 2 sample N=418. Unique to in-person survey.

34

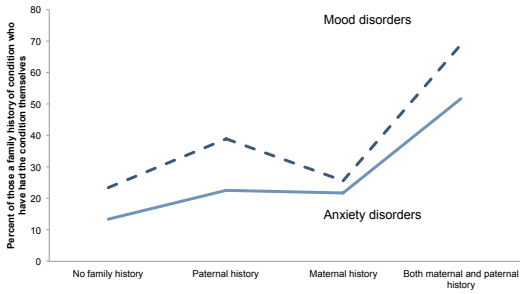
Those with a family history of alcohol abuse or dependence are more likely to have a disorder themselves



Wave 2 sample N=418. Unique to in-person survey.

35

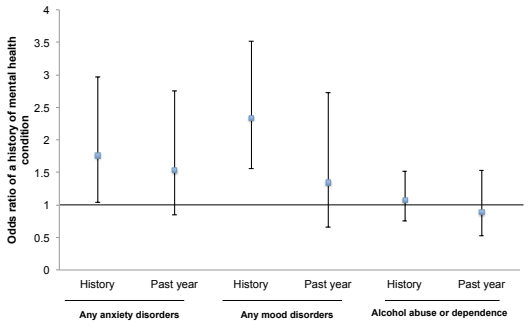
Those who have a family history of psychiatric disorders on both sides have the highest prevalence of mood and anxiety disorder



Wave 2 sample N=418. Unique to in-person survey.

36

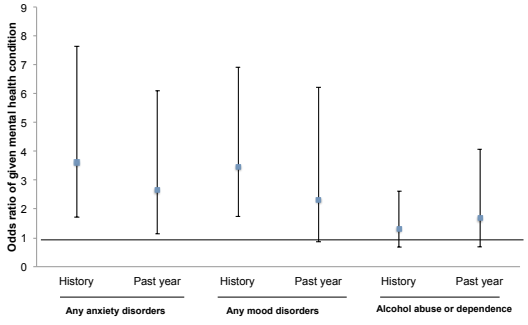
Physical abuse as a child is associated with a history of anxiety and mood disorders



In-person sample wave 2 (N=418). Unique to in-person survey. Multivariable models were adjusted for gender.

37

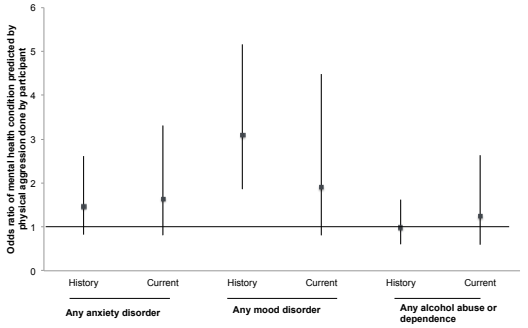
Sexual abuse as a child is associated with current and a history of anxiety disorders



In-person sample wave 2 (N=418). Unique to in-person survey. Multivariable models were adjusted for gender.

38

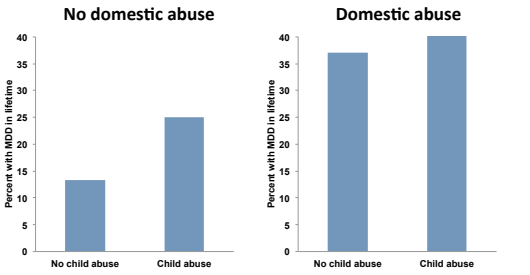
Physical aggression in domestic relationship in the past year is associated with a history of mood disorders



In-person sample wave 2 (N=418). Unique to in-person survey. This is physical violence by the participant or that occurs to participant.

39

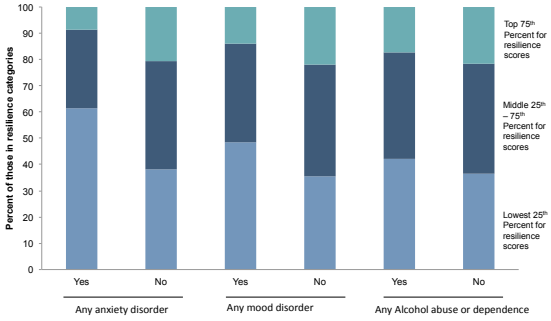
Soldiers who experienced abuse as a child have the highest risk of committing domestic abuse and the highest lifetime prevalence of MDD



Wave 1 clinical sample (N=500). Unique to the in-person survey.

40

History of anxiety and mood disorders is associated with lower resilience



Wave 2 sample (N=418). Unique to in-person survey. Resilience Scale:Wagnild, G., & Young, H. (1993). Development and psychometric evaluation of the Resiliency Scale. Journal of Nursing Measurement, 1(2), 165-178.

41

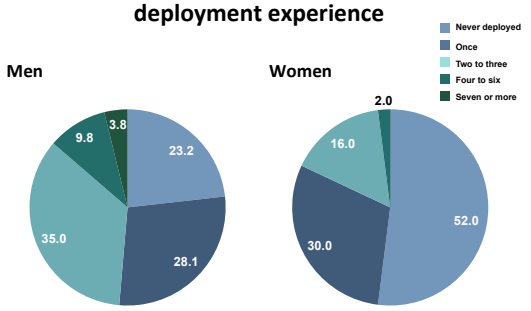
Deployment circumstances that may affect Axis I conditions in citizen soldiers

Circumstances during deployment

- Deployment experience
- Deployment conditions

42

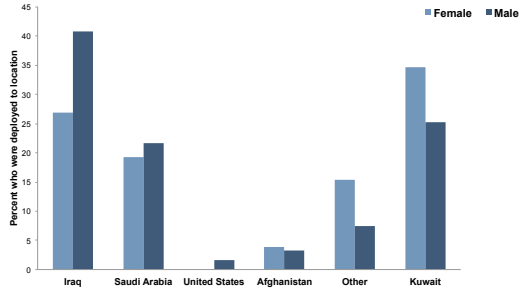
73.3% of soldiers in the clinical sample have deployment experience



Wave 1: In-person survey baseline sample that had been deployed N=335. Average number of deployments is 2.0 for men and 0.80 for women.

43

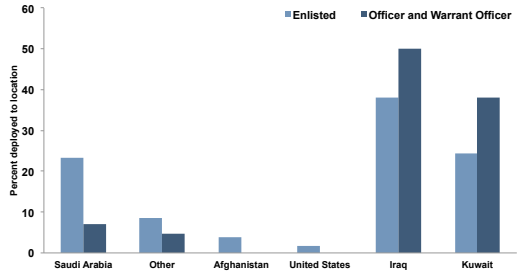
Most common location for deployment was Iraq for men (40.7%) and Kuwait for women (34.7%)



Wave 1: In-person survey baseline sample that had been deployed N=335. These were statistically different <0.05

44

Iraq was the most common deployment location for enlisted soldiers (38.1%) and officers (50%)



Wave 1: In-person survey baseline sample that had been deployed N=335. These were not statistically different <0.05s

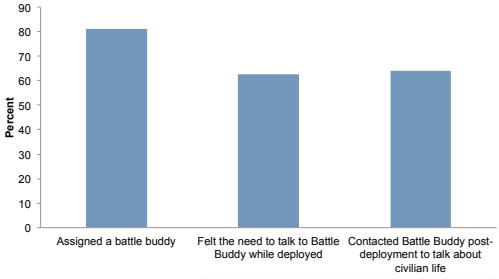
45

Characteristics related to most recent deployment

Wave 1 telephone sample among those deployed (N=1664). King LA, King DW, Vogt DS, Knight J, Samper RE. Deployment Risk and Resilience Inventory: A Collection of Measures for Studying Deployment-Related Experiences of Military Personnel and Veterans. Military Psychology 2006;18(2):89.

46

80% of those deployed report having a battle buddy



Wave 2 clinical sample N=418

47

How do deployment experiences affect Axis I conditions?

Circumstances during deployment

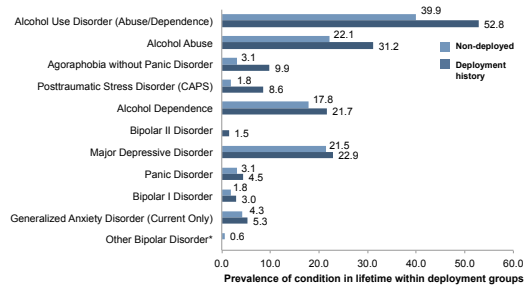
- Deployment experience
- Deployment conditions

Mental Health

Personal Wellbeing
Anxiety disorders
Mood disorders
Alcohol disorders
Substance use disorders
Somatoform disorders
Eating disorders
Adjustment disorders
Suicide

48

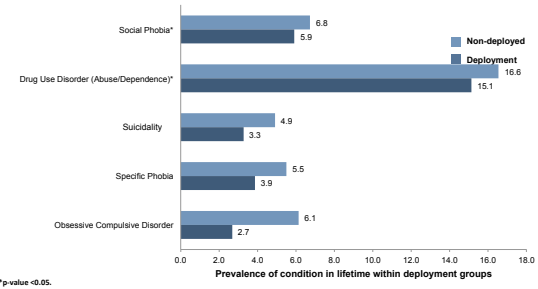
Those with deployment history have a higher prevalence of certain Axis I conditions



*p-value <0.05.

Wave 1 in-person data (N=500).Unique to in-person. Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a clinician-administered PTSD scale. Journal of Traumatic Stress 1995;8. First MB, Spitzer RL, Gibbon M, Williams JBW editors. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York: Biometrics Research, New York State Psychiatric Institute; 2002.

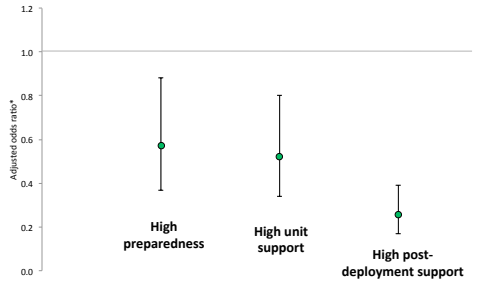
Do deployment screening procedures screen out those with a history of phobias, suicidality and drug use disorders?



*p-value <0.05.

Wave 1 in-person sample N=500. Blake DD, et al. The development of a clinician-administered PTSD scale. Journal of Traumatic Stress 1995;8. First MB, et al Editors. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York: Biometrics Research, New York State Psychiatric Institute; 2002. Sheehan DV, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychol. 1998;59 (suppl 20):22-33.

Each deployment condition is independently associated with deployment-PTSD

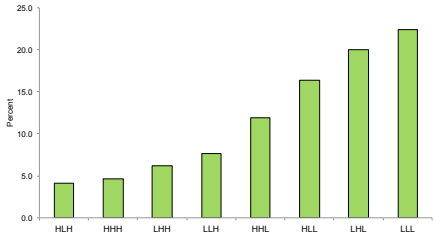


Wave 1 telephone sample who have been deployed N=1664. Low levels of each factor are reference groups.

*Models are adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced

Those with low levels of preparedness, unit support and post-deployment support have the highest prevalence of PTSD

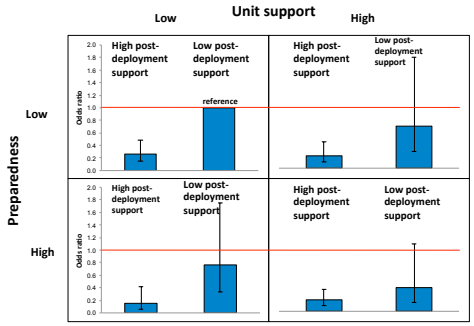
Among those who have been deployed and experienced a traumatic event during their most recent deployment (n=1294)



Wave 1 telephone sample N=1664.
e.g. HLH = high preparedness, low unit support, high post-deployment support
Scores above 21, 29, and 24 indicated high preparedness, high unit support, and high post-deployment support, respectively.

52

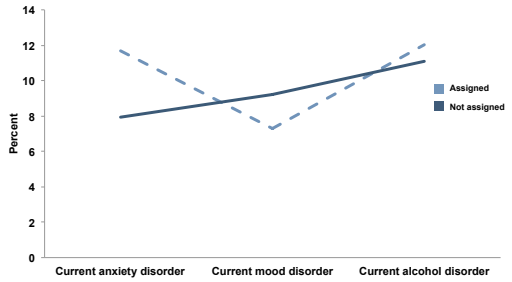
Post-deployment social support is the most important protective factor against PTSD



Wave 1 telephone sample who have been deployed N=1664. Reporting low levels of all three factors is the reference category. Regression is adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced. Significance at p<0.05.

53

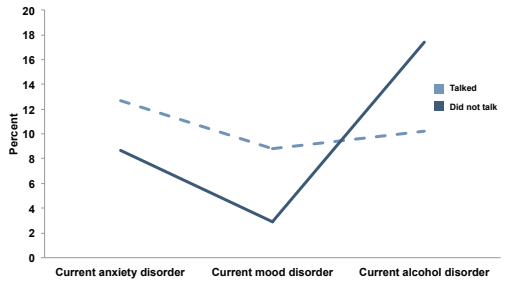
The assignment of battle buddies in the past is not associated with current mental health



Wave 2 sample among those with deployment history (N=337)

54

Reporting that they spoke to their battle buddy during or after deployment is not associated with current mental health

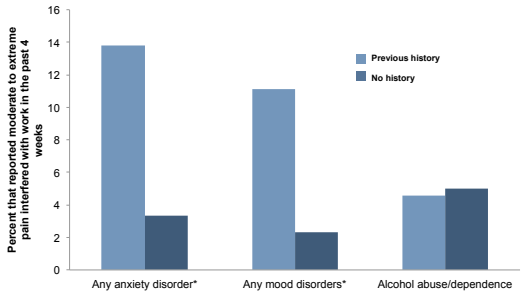


Wave 2 sample among those with battle buddies (N=274)

55

How does a history of Axis I conditions reported in Wave 1 relate to physical health and personal wellbeing in Wave 2?

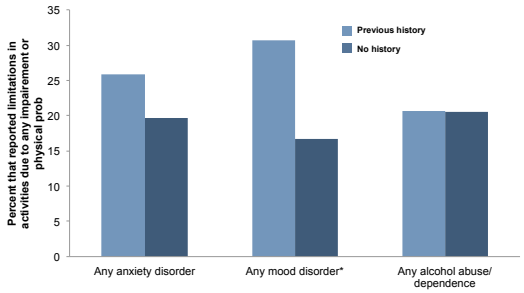
Those with anxiety disorder or mood disorder in Wave 1 likely to report pain in Wave 2



Wave 2 in-person sample N=418. Unique to in-person survey.
*p-value <0.05. Calculated among those who completed both the clinical baseline and wave 2 sample. Ware JE, Kosinski M, Keller SD. "A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity" *Medical care* 34.3 (1996).

57

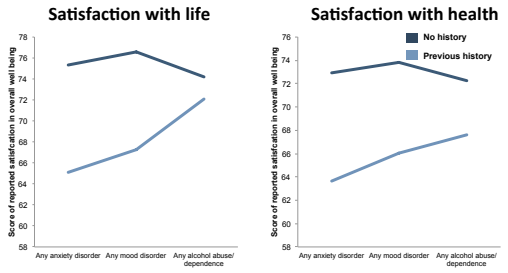
Alcohol use disorders are not yet associated with health-related activity limitation



Wave 2 in-person sample N=418. Unique to in-person survey.
*p-value <0.05. Calculated among those who completed both the clinical baseline and wave 2 sample. Ware JE, Kosinski M, Keller SD. "A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity" *Medical care* 34.3 (1996).

58

Those with Axis 1 condition report lower personal wellbeing scores

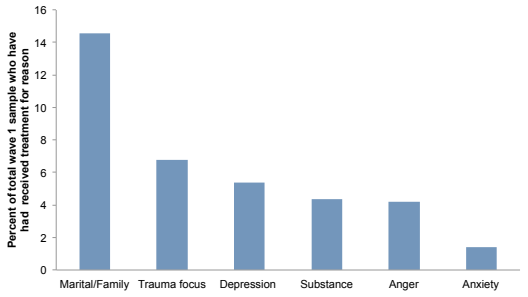


Wave 2 in-person sample (N=418). Unique to the in-person.
*p-value <0.05. Calculated among those who completed both the clinical baseline and wave 2 sample. Ware JE, Kosinski M, Keller SD. "A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity" *Medical care* 34.3 (1996).

59

Mental health treatment

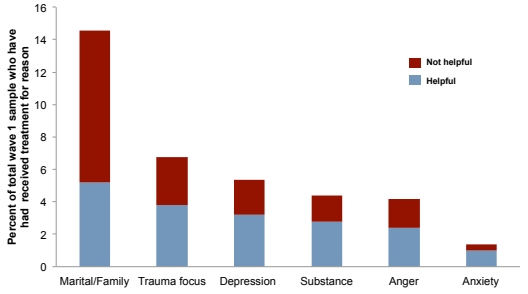
Marital problems are also the most common reason to seek mental health treatment ever in lifetime



Wave 1 sample N=500. Unique to in-person

61

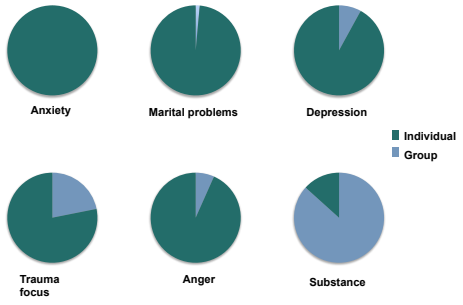
35% of those who have ever received treatment for marital problems found it helpful



Wave 1 sample N=500. Unique to in-person

62

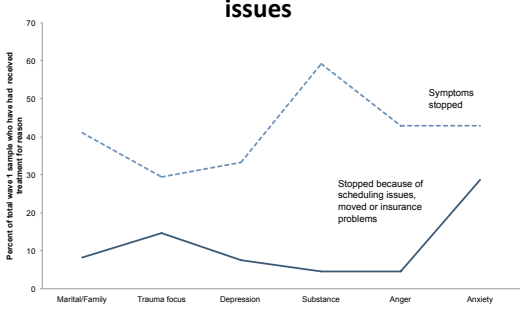
Those who sought treatment for substance abuse were more likely to have group therapy



Wave 1 sample N=500. Unique to in-person

63

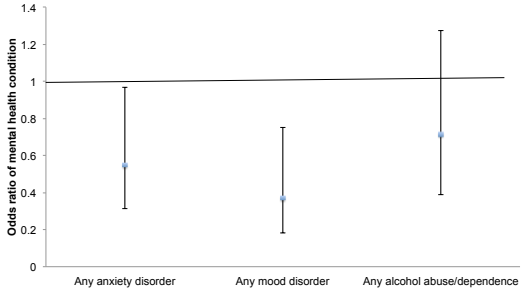
Most people who stopped did so because symptoms resolved not because of logistical issues



Wave 1 sample N=500. Unique to in-person

64

Prior treatment for mental illness was protective for current mood and anxiety disorders

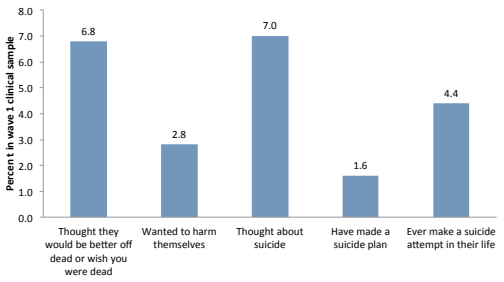


Wave 2 sample N=418. Unique to in-person

65

How does co-morbidity relate to suicidal ideation?

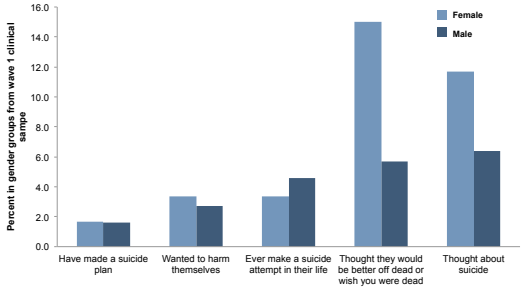
In the past 6 months, 7% of the sample have thought about suicide



Wave 1 in-person sample N=500. Unique to in-person survey.

67

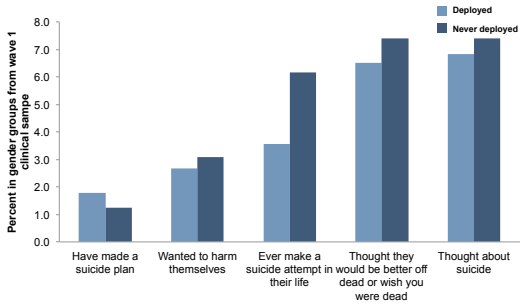
Women are more likely to make a suicide plan in the past 6 months



Wave 1 in-person sample N=500. Unique to in-person survey.

68

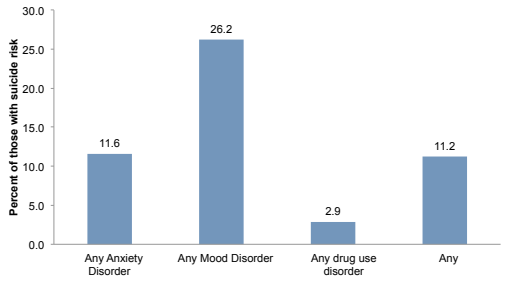
In the past 6 months, those with deployment history have fewer suicidal outcomes



Wave 1 in-person sample N=500. Unique to in-person survey.

69

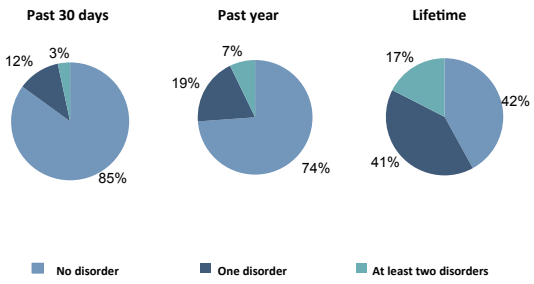
In the past 6 months, those with a history of mood disorder have the highest level of suicide risk



Wave 1 in-person sample N=500

70

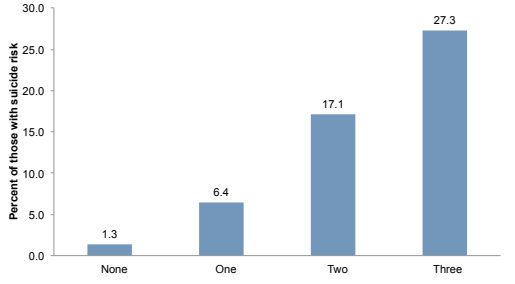
Prevalence of all condition co-morbidity



Wave 1 telephone sample N=2616.

71

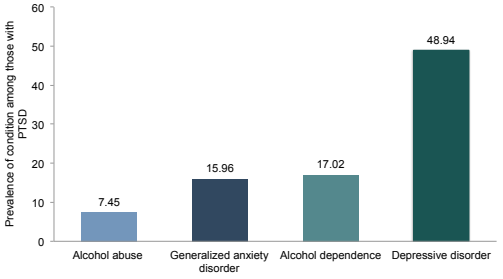
The more co-morbidity in lifetime, the greater the suicide risk



Wave 1 in-person sample N=500

72

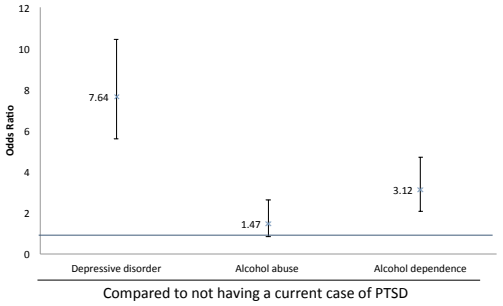
Prevalence of other conditions among those with PTSD within the past year (N=188)



Wave 1 telephone sample (N=188). 38% has no other condition, 41% had one other condition, and 20% had 2 or more.

73

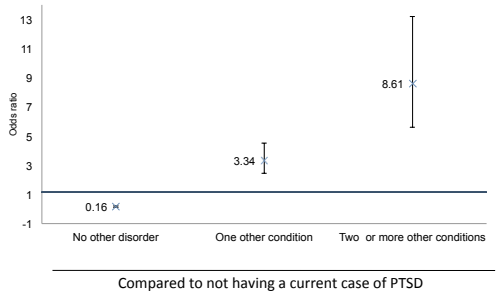
Odds ratio for those with PTSD to have another condition within the past year



Wave 1 telephone sample (N=2616).

74

Odds ratio for those with PTSD to have another condition within the past year

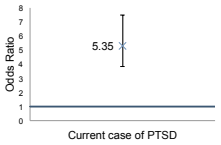


Wave 1 telephone sample (N=2616).

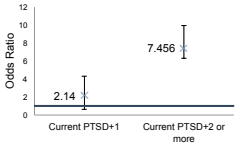
75

Odds ratio for suicidal ideation

Compared to those without PTSD in the past year, those with PTSD are 5 times more likely to have a history of suicidal ideation.



Compared to PTSD alone those with at least 2 more conditions within the past year are 7 times more likely to have a history of suicidal ideation

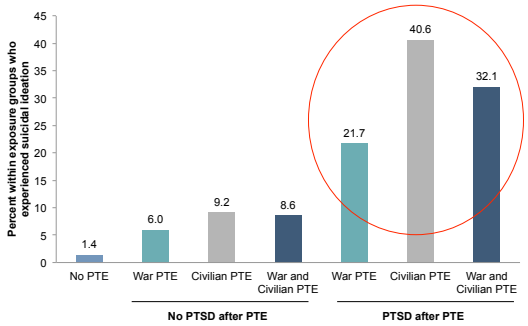


Wave 1 telephone sample N=2616.

76

How does the type of potentially traumatic event exposure and PTSD relate to suicidal ideation?

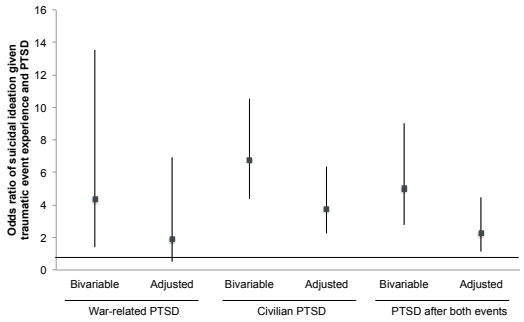
Those with civilian PTE experiences have the highest prevalence of suicidal ideation



PTE – potentially traumatic event. Wave 1 telephone data N=1129.

78

Those with civilian PTSD compared to civilian events alone have the highest odds of suicidal ideation

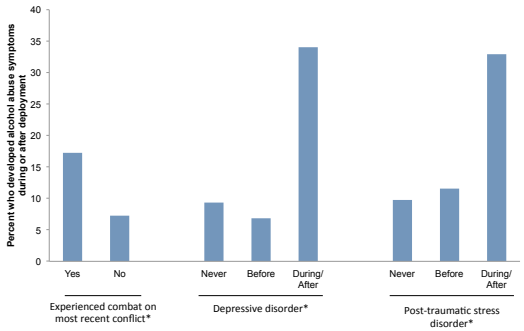


PTE – potentially traumatic event. Wave 1 telephone data N=1129.

79

What is the relationship between mental health disorders and peri/post-deployment alcohol abuse?

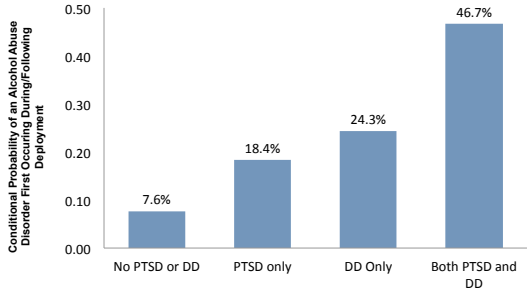
Factors associated both with civilian and deployment are associated with incident alcohol abuse



Wave 1 telephone sample among those who never had alcohol disorder before being deployed (N=963)

81

Those with both PTSD and depression developed during/after deployment have the highest probability of developing alcohol abuse

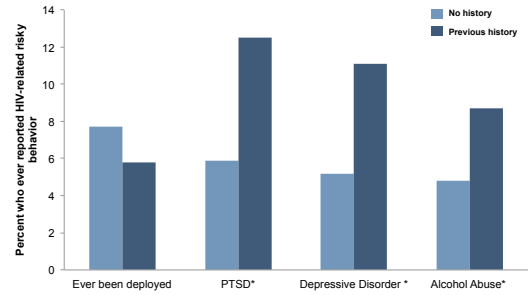


Wave 1 telephone sample among those who never had alcohol disorder before being deployed (N=963)
DD – any depressive disorder.
These are the predicted probabilities from multivariable logistic regressions adjusted for other variables (age, gender, race, education, income, deployment location, marital status, family history of substance abuse) entered in the multivariate regression model. Note: depression and PTSD are both defined as first occurring during or following deployment.

82

Mental health and HIV risky behaviors among Guard soldiers

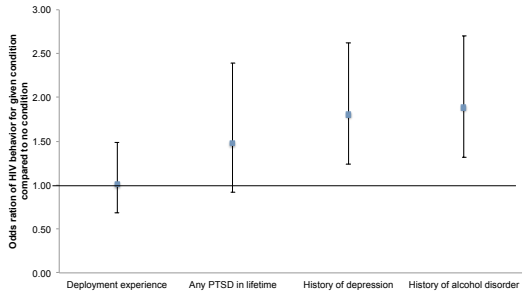
History of mental health conditions is related to HIV-related risky behaviors in the past year



Wave 1 telephone sample, N=2374
Defined as an affirmative response to at least one of the following: (in the past year, have you) used intravenous drugs; been treated for a sexually transmitted or venereal disease; given or received money or drugs in the exchange for sex; had anal sex without a condom.

84

In multivariable logistic models, a history of depression and alcohol disorder were associated with current HIV risky behavior



Wave 1 telephone sample, N=2374
Defined as an affirmative response to at least one of the following: (in the past year, have you) used intravenous drugs; been treated for a sexually transmitted or venereal disease; given or received money or drugs in the exchange for sex; had anal sex without a condom.

85

Long-term outcomes

- Psychopathology
- Social outcomes
- Legal
- Family
- Work
- Homelessness

86

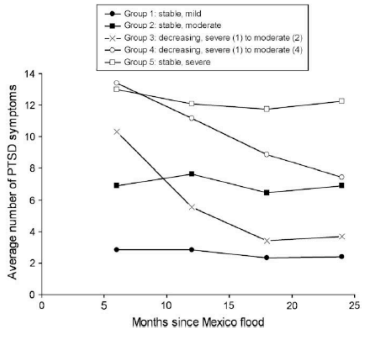


Fig. 2. Trajectories of PTSD symptoms among residents of Villahermosa and Teziutlán in Mexico ($n = 561$) after the 1999 flood. Numbers in parentheses refer to the wave of assessment.

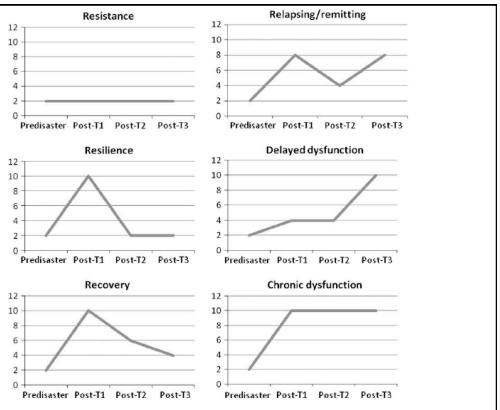
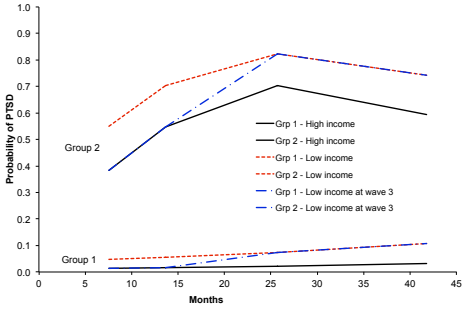


Fig. 1. Hypothesized trajectories of the course of stress responses.

88

Trajectory with time varying covariates



89

Unique contributions of two assessments in the OHARNG MHI

- Telephone survey
  - Large representative sample of guard soldiers allowing more detailed assessment of sentinel disorders
- In-person survey
  - Exhaustive assessment of all psychiatric disorders
  - Assessment of childhood conditions
  - Assessment of current risk behaviors
  - Detailed assessment of social, legal and family consequences
  - Detailed assessment of deployment conditions and experiences

90

Therefore, if we did not have both parts we would lose

- Telephone survey
  - Large representative sample of guard soldiers allowing more detailed assessment of sentinel disorders
- In-person survey
  - Exhaustive assessment of all psychiatric disorders
  - Assessment of childhood conditions
  - Assessment of current risk behaviors
  - Detailed assessment of social, legal and family consequences
  - Detailed assessment of deployment conditions and experiences

91

Alcohol Abuse

A maladaptive pattern of use leading to clinically significant impairment, as manifested by one (or more) of the following occurring within a 12 month period:

- Recurrence alcohol use that results in failure to fulfill major role obligations at work, school, or home (such as repeated absences from work, school, family, etc
- Recurrent alcohol use in situations in physically hazardous situations (driving, etc.).
- Legal problems (arrests, disorderly conduct, DUIs).
- Continued use despite having persistent or recurrent problems.

92

Alcohol Dependence

A maladaptive pattern of use leading to clinically significant impairment, as manifested by at least 3 of the following occurring in the same 12 month period:

- Development of tolerance to alcohol
- Alcohol withdrawal symptoms
- Alcohol is taken in increasingly large amounts
- Persistent desire or unsuccessful efforts to cut down
- A great deal of time is spent obtaining alcohol.
- Social, occupational, or recreational activities given up
- Alcohol use continues despite knowing it has become a big problem.

93

Assessment of psychopathology in the telephone survey

PTSD

PTSD – presence of criteria A – F. Criteria B, C, and D assessed using 17-item PTSD Checklist (PCL-C): cluster scoring : ≥ 1 B symptom, ≥ 3 C symptoms, and ≥ 2 D symptoms, experienced at least "moderately"

Evaluated symptoms from worst event that was deployment related and worst event non-deployment related.

American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (IV). Washington, DC.
Weathers, F., Litz, B., Herman, D., Huska, J., Kean, T., (1993). The PTSD Checklist (PCL): Reliability, Validity and Diagnostic Utility. Paper presented at the Annual Convention of the International Society for Traumatic Stress Studies, San Antonio (DMS-III-R PCL-M). http://www.pdhealth.mil/guidelines/appendix3.asp
http://www.pdhealth.mil/guidelines/appendix3.asp

94

Assessment of psychopathology in the telephone survey (cont.)

Depression

9-item Patient Health Questionnaire (PHQ-9)

Depression cases experienced at least 2 of the 9 symptoms "more than half the days" and 1 of the symptoms is depressed mood or anhedonia for a period of at least 2 weeks

Major depressive disorder experienced at least 5 of the 9 symptoms "more than half the days" and 1 of the symptoms is depressed mood or anhedonia for a period of at least 2 weeks

American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (IV). Washington, DC.
Kroenke et al 2001

95

Assessment of psychopathology in the telephone survey (cont.)

Generalized Anxiety Disorder

Generalized Anxiety Disorder 7-item scale (GAD-7) where symptoms rated 0 (not at all) to 3 (nearly every day)

GAD cases reported symptoms of at least moderate anxiety (score ≥ 10)

Symptom duration ≥ 6 months

Alcohol Abuse

Mini International Neuropsychiatric Interview (MINI)

Criterion 1 - at least 1 symptom of maladaptive pattern of substance use leading to clinically significant impairment or distress and criterion 2-symptoms never met the criteria for alcohol dependence.

Spitzer et al 2006; American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (IV). Washington, DC; Sheehan et al, 1998

96

Assessment of psychopathology in the telephone survey (cont.)

Alcohol Dependence

Mini International Neuropsychiatric Interview (MINI)

Met at least 3 symptoms of maladaptive pattern of alcohol abuse leading to clinically significant impairment or distress

Suicidal Ideation (PHQ-9)

Thoughts of wanting to hurt themselves or that they would be better off dead

Spitzer et al 2006; American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (IV). Washington, DC; Sheehan et al, 1998

97

Assessment in the clinical appraisal

PTSD

Clinician-Administered PTSD Scale (CAPS) used as gold standard

All positive symptoms required a frequency of 1 and an intensity of 2

All DSM-IV criteria met (A,B,C,D,E and F)

Depression, GAD, Alcohol Abuse and Alcohol Dependence:

SCID used as gold standard

98

PTSD in the telephone survey

Based on DSM-IV criteria:

A. Traumatic event experience, with response involving intense fear, horror, or helplessness

B. Re-experiencing of traumatic event

C. Avoidance of stimuli associated with event and numbing of general responsiveness

D. Symptoms of increased arousal

E. Duration of symptoms > 1 month

F. Symptoms cause significant distress or impairment

Criteria B, C, and D assessed using 17-item PTSD Checklist (PCL):

- cluster scoring : > 1 B symptom, > 3 C symptoms, and > 2 D symptoms, experienced at least "moderately"

Evaluated symptoms from worst event that was deployment related and worst event non-deployment related.

American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (IV). Washington, DC.

Weathers, F., Litz, B., Herman, D., Huska, J., Kean, T., (1993). The PTSD Checklist (PCL): Reliability, Validity and Diagnostic Utility. Paper presented at the Annual Convention of the International Society for Traumatic Stress Studies, San Antonio (DMS-III-R PCL-M). http://www.pdhealth.mil/guidelines/appendix3.asp http://www.pdhealth.mil/guidelines/appendix3.asp

99

Major depression in the telephone survey

Based on DSM-IV criteria:

- 9-item Patient Health Questionnaire (PHQ-9)
- Depression cases experienced at least 2 of the 9 symptoms "more than half the days" and 1 of the symptoms was depressed mood or anhedonia for a period of at least 2 weeks

Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med. 2001;16:606-613.'

100

Ohio Army National Guard Mental Health Initiative

O•N•G
OHIO NATIONAL GUARD STUDY

1

Ohio National Guard Mental Health Initiative (OHARNG-MHI)

- 10-year longitudinal study which began in November 2008 that annually monitors the factors associated with and course of mental health within a representative sample of service members from the Ohio Army National Guard
- Collaboration between University Hospitals Case Medical Center, University of Toledo, Columbia University and University of Michigan

2

Study Aims

Specific Aim #1: To study the relationship between deployment-related experiences and the development and trajectory of DSM-IV Axis I diagnoses

Specific Aim #2: To document the factors across the lifespan that are associated with resilience to DSM-IV Axis I diagnoses and with better post-deployment function

Specific Aim #3: To study the relation between National Guard-specific pre-deployment and post-deployment factors and the risk of development of DSM-IV Axis I disorders

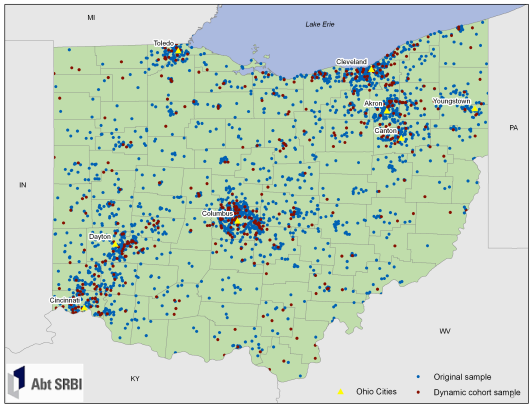
3

Study Design

The study population of the OHARNG-MHI is the OHARNG soldiers who served in the Guard between June 2008 and February 2009 .

- Baseline sample composed of randomly selected men and women 18 years or older and capable of informed consent
- Cohort members are interviewed annually for 10 years
  - Annual telephone interview conducted with all participants
  - Annual clinical interviews conducted on random sub-sample
- Replenishment of cohort occurs each year by randomly selecting newly enrolled Ohio Army National Guard personnel

4



Baseline telephone interview (N=2616)

- Mailed alert letter to random sample of OHARNG personnel and permitted a 3 week opt-out period
- Called possible participants beginning in December of 2008 until November 2009
- Participants were consented on the telephone and information was collected with computer assisted telephone interview
- Duration approximately 1 hour
- Will conduct annual interviews until 2019

6

Baseline in-person interview (N=500)

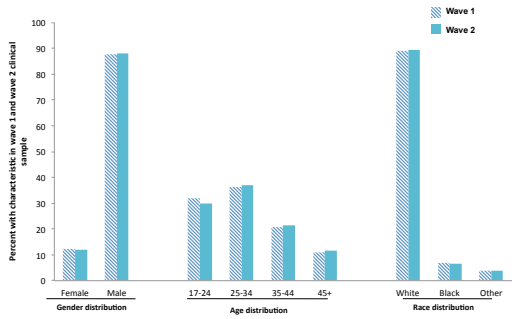
- Randomly sampled participants among all who completed telephone survey
- Consent and in-depth information on interview process were mailed to interested participants ahead of interview
- Performed by clinician and occurred in local setting chosen by participant
- Duration approximately 2 hours

7

Some examples of data available

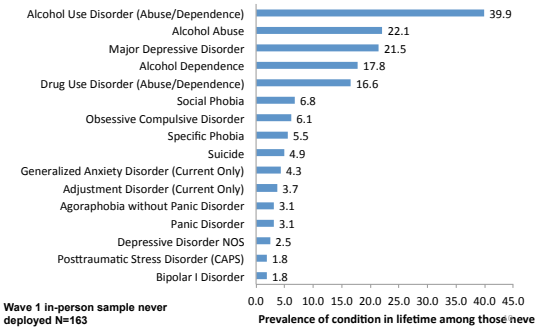
8

Characteristics of the sample



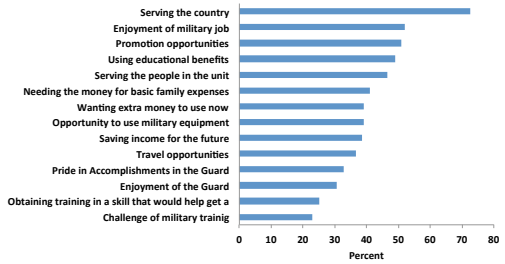
* p-value <0.05. This is calculated from baseline (N=500) and wave 2 clinical sample (N=418). Data used was their response on the baseline telephone survey. The other category included Native American and Asian.

Lifetime mental health (among those non-deployed)



Wave 1 in-person sample never deployed N=163

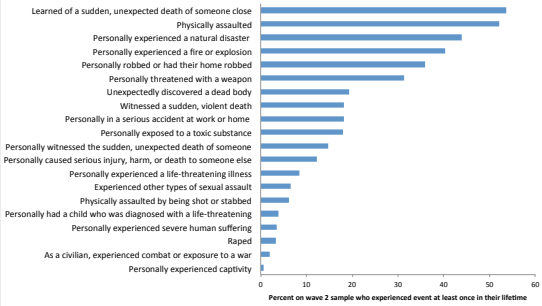
Most common reason people stay in the guard is to serve their country



Wave 2 clinical sample N=418. Unique to in-person sample.
Why stayed in the Guard - 2000 Reserve Component Survey:
Simmons RO, D'Amato-Neff AL, Ferro G, & Lappin BM (2002, July). 2000 Survey of reserve component personnel: Administration, datasets, and codebook. DMDC Report No. 2002-004. VA, Defense Manpower Data Center

11

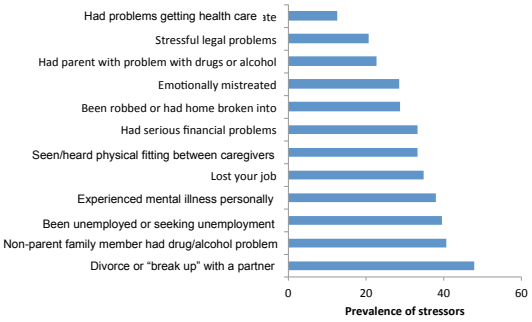
Most common type of traumatic event that occurred in lifetime was sudden death of someone close



Wave 2 In-person sample. N=417. Note this is the the report of events that have been reported at least once and does not include multiple accounts of a single type of event. This is not an exhaustive list.

12

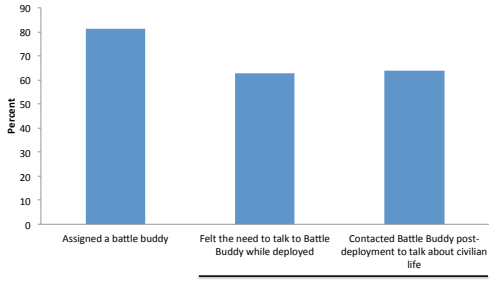
OHARNG members are dealing with civilian stressors in addition to their deployment-related experiences



Wave 1 telephone sample N=2616

13

80% of those deployed report having a battle buddy

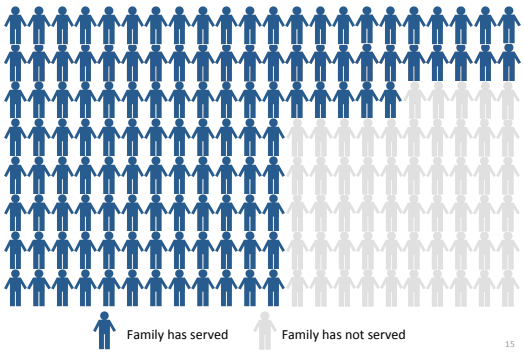


Among those who report battle buddy

Wave 2 clinical sample N=418

14

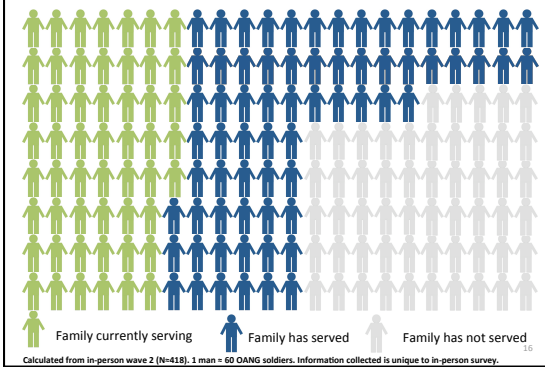
Most soldiers have family members who have served (69.5%)



Calculated from in-person wave 2 (N=418). 1 man = 60 OANG soldiers. Information collected is unique to in-person survey.

15

21% have family members currently serving



Calculated from in-person wave 2 (N=418). 1 man = 60 OANG soldiers. Information collected is unique to in-person survey.

16

Suicide and mental health

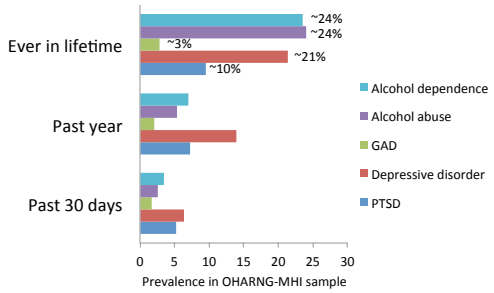
17

Study aim

Examine the prevalence of PTSD comorbidity in the OHARNG MHI sample and determine if those with PTSD comorbidity are more likely to report suicidal ideation.

18

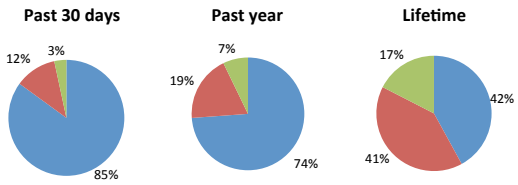
Prevalence of Psychopathologies



Lifetime:42% had none of the 5 conditions, 41% had at least 1, and 17.5% had at least 2 .

19

Prevalence of mental health conditions is relatively low (15-26%) in past month or year, but the majority (58%) had lifetime history

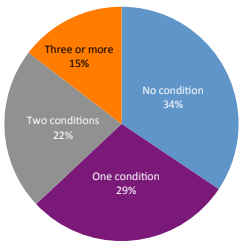


"Look for illness before or after military service not just during."

No disorder | One disorder | At least two disorders

20

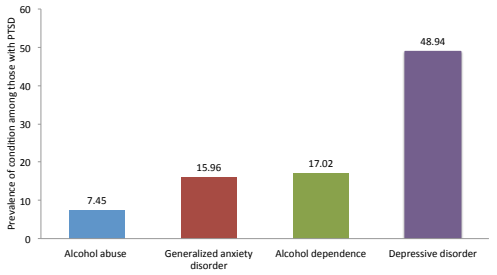
66% of the Wave 1 sample have had at least one condition ever in their lifetime (N=500)



According to the NCS-R 46.4% of the general US population have had at least one condition and 17.3% have had three or more conditions. These estimates are based on the in-person interview using the SCID, conditions include alcohol disorder, major depressive disorder, drug use disorder, social phobia, PTSD, generalized anxiety disorder, specific phobia, panic disorder, obsessive compulsive disorder, agoraphobia with a history of panic disorder, adjustment disorder, bipolar I and II, depressive disorder NOS, dysthemic disorder, anxiety disorder NOS, eating disorder, substance-induced mood disorder, body dysmorphic disorder, hypochondriasis, psychotic symptoms.

21

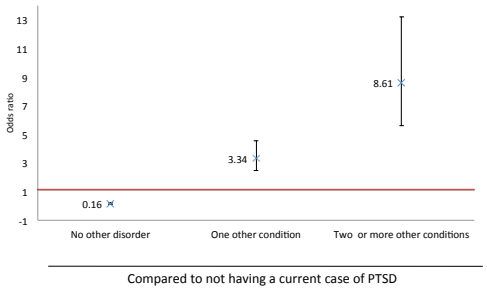
Prevalence of other conditions among those with PTSD within the past year (N=188)



38% has no other condition, 41% had one other condition, and 20% had 2 or more.

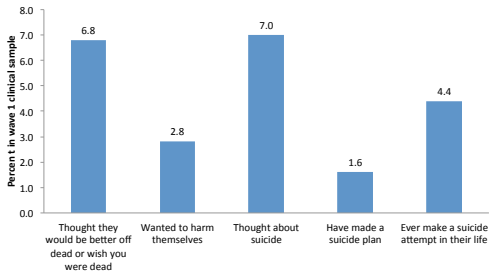
22

Odds ratio for those with PTSD to have another condition within the past year



23

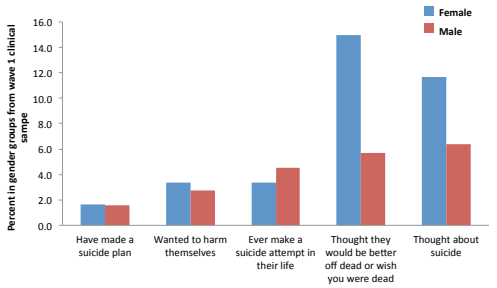
In the past 6 months, 7% of the sample have thought about suicide



Wave 1 in-person sample N=500

24

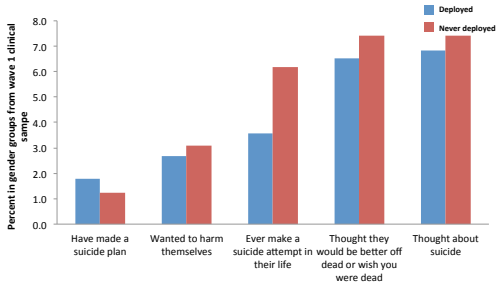
In the past 6 months, women were more likely to make a suicide plan



Wave 1 in-person sample N=500

25

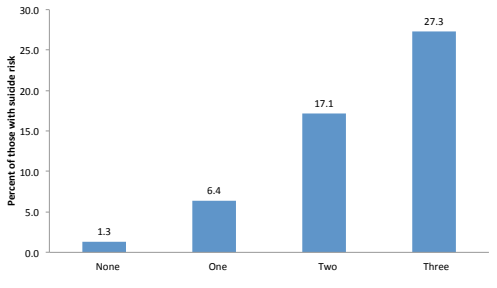
In the past 6 months, those with deployment history have fewer suicidal outcomes



Wave 1 in-person sample N=500

26

The more co-morbidity in lifetime, the greater the suicide risk



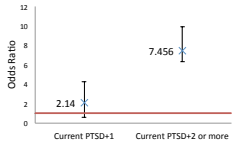
Wave 1 in-person sample N=500

27

Odds ratio for suicidal ideation

- Compared to those without PTSD in the past year, those with PTSD are 5 times more likely to have a history of suicidal ideation.

- Compared to PTSD alone those with at least 2 more conditions within the past year are 7 times more likely to have a history of suicidal ideation



28

Soldier preparation and mental health

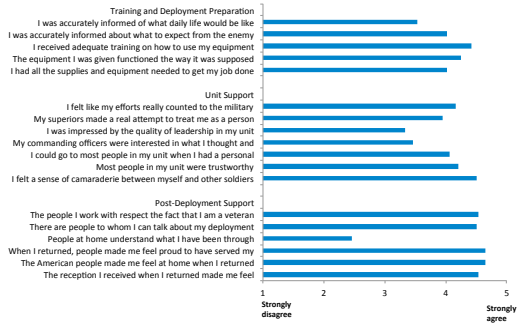
29

Study aim

To examine soldier's perception of efforts at preparedness and determine which of those efforts are protective against developing PTSD

30

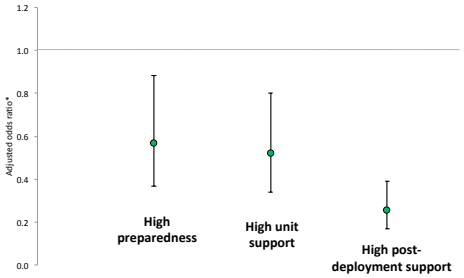
Preparing soldiers before, during, and after deployment



Wave 1 telephone sample among those deployed (N=1664). King LA, King DW, Vogt DS, Knight J, Samper RE. Deployment Risk and Resilience Inventory: A Collection of Measures for Studying Deployment-Related Experiences of Military Personnel and Veterans. Military Psychology 2006;18(2):89.

31

Each deployment condition is independently associated with deployment-PTSD

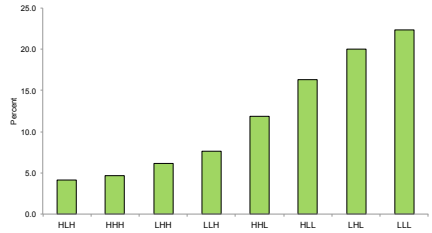


Wave 1 telephone sample who have been deployed N=1664. Low levels of each factor are reference groups.
***Models are adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced**

32

Those with low levels of preparedness, unit support and post-deployment support have the highest prevalence of PTSD

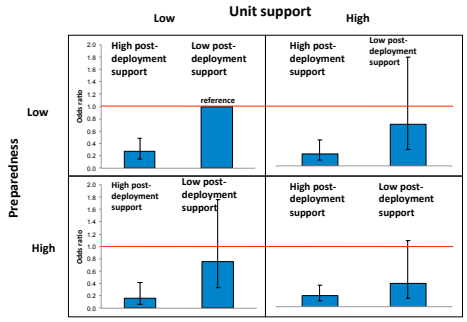
Among those who have been deployed and experienced a traumatic event during their most recent deployment (n=1294)



Wave 1 telephone sample N=1664.
e.g. HLH = high preparedness, low unit support, high post-deployment support
Scores above 21, 29, and 24 indicated high preparedness, high unit support, and high post-deployment support, respectively.

33

Post-deployment social support is the most important protective factor against PTSD



Wave 1 telephone sample who have been deployed N=1664. Reporting low levels of all three factors is the reference category. Regression is adjusted for gender, age, race, income, educational attainment, marital status, rank (officer vs. enlisted, cadets, and civilian employees), most recent deployment location (to non-conflict area vs. conflict area), and total number of deployment-related traumatic events experienced. Significance at p<0.05.

34

Clinical implications and discussion

35

Completed suicide and suicidal ideation

- 2007 US data suggest completed suicides were the 2nd leading cause of death among 25-34 y/o and 3rd among 15-24 y/o.
- 90% of completed suicides have a pre-existing DSM-IV disorder and bivariable associations between disorders and suicide attempts vary from a low OR of 2.7 for agoraphobia, to 5.7 for PTSD, and 6.7 for BPD.
- Regardless of primary diagnosis, the # of comorbid diagnoses robustly predicts risk for suicide attempts.
  - 1 Axis I comorbid disorder OR 3.7, 2 yields 6.8, 3 yields 12.1, and 6 yields 29.0

http://webappa.cdc.gov/cgi-bin/broker.exe. Nock et al. Molecular Psychiatry 2010;15:868-76. BPD – bipolar disorder. Kessler et al. Arch Gen Psychiatry. 2005.

36

POINT 1
Suicide Prevention within the General US Population

- Completed suicides are the 2nd leading cause of death among 25-34 y/o in the general population.
- 90% of completed suicides have a pre-existing mental health condition.
- The risk for suicide attempts for those with PTSD is increased nearly six-fold.
- The # of co-occurring mental health conditions increases the risk for suicide attempts.

37

POINT 2
Soldier Preparation

- There is good evidence to support the impression that the training a soldier receives improves their resilience to the development of mental health conditions.
- High levels of high preparedness, high levels of unit support, and high levels of post-deployment support make soldiers less likely to development mental health conditions.

38

POINT 3
Traumas and stressors

- Soldiers with pre-existing civilian trauma and pre-existing work and family life stress may become more resilient through training that results in:
  - high levels of preparedness,
  - high levels of unit support,
  - high levels of post deployment support.

39

Unique contributions of this study

40

Unique contributions of two assessments in the OHARNG MHI

- **Telephone survey**
  - Large representative sample of guard soldiers allowing more detailed assessment of sentinel disorders
- **In-person survey**
  - Exhaustive assessment of all psychiatric disorders
  - Assessment of childhood conditions
  - Assessment of current risk behaviors
  - Detailed assessment of social, legal and family consequences
  - Detailed assessment of deployment conditions and experiences

41

Therefore, if we did not have both parts we would lose

- **Telephone survey**
  - Large representative sample of guard soldiers allowing more detailed assessment of sentinel disorders
- **In-person survey**
  - Exhaustive assessment of all psychiatric disorders
  - Assessment of childhood conditions
  - Assessment of current risk behaviors
  - Detailed assessment of social, legal and family consequences
  - Detailed assessment of deployment conditions and experiences

42

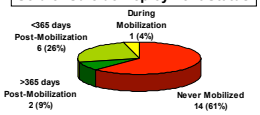
Dissemination/Translation Function of the OHARNG MHI

- OHARNG relies on OhioCares to develop consensus regarding areas of unmet need.
- Chaplain Chou and Dr. Kaufman review with leadership.
- OHARNG-MHI study used to better understand the magnitude of the unmet need.

43

OHARNG EXPERIENCE (2000-2009)

Soldier Suicide Deployment Status



Age of Soldier Suicides

Teens	20s	30s	40s	50s
1	13	4	3	2

Ave Age = 30.56 Years

Grade of Soldier Suicides

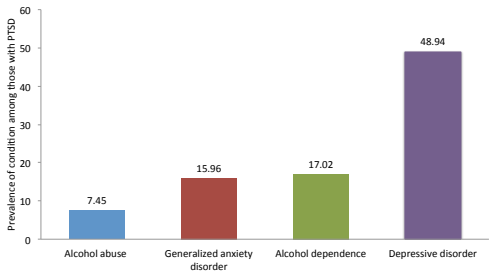
E2	E3	E4	E5	E6	E7	E8
1	5	6	4	6	0	1

MSC Suicide Experience

JFHQs	37th	16th	174th	73d	371st
1	5	8	4	2	3

As of: 6 OCT 09

Prevalence of other conditions among those with PTSD within the past year (N=188)



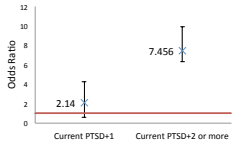
38% has no other condition, 41% had one other condition, and 20% had 2 or more.

45

Odds ratio for suicidal ideation

- Compared to those without PTSD in the past year, those with PTSD are 5 times more likely to have a history of suicidal ideation.

- Compared to PTSD alone those with at least 2 more conditions within the past year are 7 times more likely to have a history of suicidal ideation



46

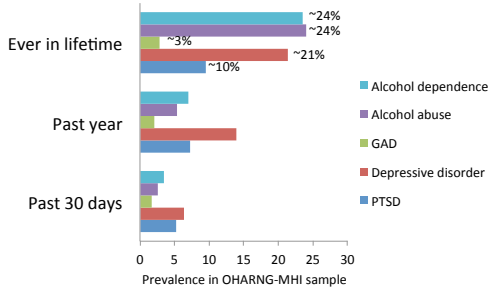
Suicide Prevention Training Modified to Reflect Importance of Co-occurring Illness

- TY2011 OHARNG Suicide Prevention Training for leadership to inform soldiers of risk and prevention for suicide in unit
- Warning card handed out to all soldiers that highlights the symptoms to be wary of in taking action to get the soldier help and if immediate action should be taken.

47

Alcohol Abuse and Dependence as the Most Common Lifetime Psychiatric illness

-Telephone Survey Wave 1-



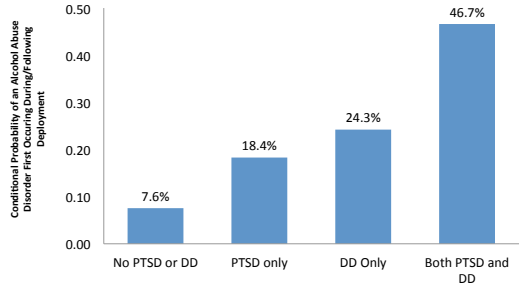
Lifetime:42% had none of the 5 conditions, 41% had at least 1, and 17.5% had at least 2

Within the general adult population, what proportion of alcohol use disorders have some other mental health condition?

- 62% of people who meet criteria for alcohol abuse also have some other mental health condition.
- 81% of people who meet criteria for alcohol dependence also have some other mental health condition.

Kessler et al 1994. 49

Those with both PTSD and depression developed during/after deployment have the highest probability of developing alcohol abuse



Wave 1 telephone sample among those who never had alcohol disorder before being deployed (N=963). DD – any depressive disorder.

50

Alcohol Abuse

A maladaptive pattern of use leading to clinically significant impairment, as manifested by one (or more) of the following occurring within a 12 month period:

- Recurrence alcohol use that results in failure to fulfill major role obligations at work, school, or home (such as repeated absences from work, school, family, etc
- Recurrent alcohol use in situations in physically hazardous situations (driving, etc.).
- Legal problems (arrests, disorderly conduct, DUIs).
- Continued use despite having persistent or recurrent problems.

51

Alcohol Dependence

A maladaptive pattern of use leading to clinically significant impairment, as manifested by at least 3 of the following occurring in the same 12 month period:

- Development of **tolerance to alcohol**
- Alcohol withdrawal symptoms
- Alcohol is taken in increasingly large amounts
- Persistent desire or unsuccessful efforts to cut down
- A great deal of time is spent obtaining alcohol.
- Social, occupational, or recreational activities given up
- Alcohol use continues despite knowing it has become a big problem.

DISCUSSION

Q &A

53

Kimberly M. Wilson, University of Toledo
NASW Ohio Chapter Annual Conference
Version: 9/23/2010

http://www.naswoh.org/displayemailforms.cfm?emailformnbr=137001

Current Word Count: 150
Word Count Limit: 150
Submission Deadline Date: September 30, 2010

Ethics in trauma research: participant reactions to trauma questions in the Ohio National Guard (ONG)

Abstract

There may be concern about iatrogenic harm to participants in studies concerned with history of traumatic event experiences. Although several studies have shown that participants in such research generally appreciate their research engagement and are not harmed by it, this has not been considered in military populations. In-person interviews of ONG members were conducted in the Combat Mental Health Initiative. Axis-I DSM-IV psychopathology was assessed, including PTSD and detailed trauma history. Of 500 participants, 17.2% (n=86) reported being upset by the survey questions at some point during the survey and 7.0% (n=6) of those reported still being upset at the end. Factors associated with increasing the likelihood of participant upset were: history of childhood abuse/neglect ($p<.0001$); suicidal ideation (34%, $p=.001$); female gendered participant (37.3%, $p<.0001$); male-gendered interviewer (24.4%, $p=.0002$); MDD (31.8%, $p<.0001$), GAD (37.5%, $p=.013$), BPD (50.0%, $p=.0023$), alcohol use disorder (21.2%, $p=.0274$), drug use disorder (28.6%, $p=.0045$), and PTSD (61.3%, $p<.0001$). Proportion of participants who reported discomfort with the study questions was in range of, although a bit higher, than that reported in civilian populations. Understanding the determinants of discomfort

in assessments of this population has important implications for work that, over the next few years, aims to study mental health among returning soldiers.

Title: Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard.

Educational Objectives

1. Recognize the importance of screening for alcohol use disorders in individuals who have served in the military.
2. Compare lifetime prevalences of depressive disorders and PTSD in the Ohio Army National Guard (OHARNG) to prevalences in the general population.
3. Understand the reliability and validity findings of the methodology being used in the baseline year of this longitudinal study of OHARNG members.

Abstract

Objective

To explore lifetime prevalence of mental disorders and report reliability and validity findings from the baseline year in an ongoing study of the Ohio Army National Guard (OHARNG).

Method

2616 randomly selected OHARNG soldiers received hour-long structured telephone surveys including PTSD Checklist (PCL-C) and Patient Health Questionnaire – 9 (PHQ-9); a subset (N=500) was randomly selected to participate in 2 hour clinical reappraisals, using the Clinician-Administered PTSD Scale (CAPS) and SCID. Interviews occurred between Nov. 2008 and Dec. 2009, and there was an overall 43% participation rate.

Results

The baseline sample was comparable to the OHARNG overall where the majority were male (85%), white (88%) and enlisted personnel or cadets (87%). Most commonly reported lifetime conditions for the telephone sample were: alcohol abuse 24%, alcohol dependence 23.5%, “any depressive disorder” 21.4%, and PTSD 9.6%. Compared to the CAPS, the telephone survey assessment for PTSD was highly specific (92% (SE 0.01)) with moderate sensitivity (54% (SE 0.09)). The telephone assessment (PHQ-9) of “any depressive disorder” also was very specific (83% (SE 0.02)) and moderately sensitive (51% (SE 0.05)) compared to clinical reappraisals using the SCID. Other psychopathologies assessed on the telephone included alcohol abuse (sensitivity 40%, (SE 0.04) and specificity 80% (SE 0.02)) and alcohol dependence (sensitivity, 60% (SE 0.05) and specificity 81% (SE 0.02)).

Conclusions

Validity and reliability statistics for telephone assessments indicated the methods performed well as research instruments. This ten year longitudinal study is expected to advance knowledge of the trajectories of post-deployment psychopathologies among OHARNG members.

Co-Author(s) Information

Marijo Tamburrino, M.D., Marta Prescott MPH, Joseph Calabrese, M.D., Israel Liberzon, M.D., Renee Slembarski, M.B.A., Emily Goldmann, M.P.H., Edwin Shirley, Ph.D., Thomas Fine, M.A., Toyomi Goto, M.A., Kimberly Wilson, MSW, Stephen Ganocy, Ph.D., Philip Chan, M.S., Alphonse Derus, B.S., Mary Beth Serrano, M.A., James Sizemore, M.Div., Sandro Galea, M.D.

FOR SUBMISSION AS A Scientific and Clinical Report:

Psychiatric Comorbidity in the Baseline Sample of 2,616 Soldiers in the Ohio Army National Guard Study of Combat Mental Health

Joseph R. Calabrese, MD (1), Marta Prescott, MPH (2,3), Marijo Tamburrino, MD (4), Israel Liberzon, MD, PhD (5), Renee Slembarski (1), Emily Goldman, MA, (2,3), Edwin Shirley, PhD (1), Thomas Fine, MA (4), Toyomi Goto, MA (1), Kimberly Wilson, MSW (4), Stephen Ganocy, PhD (1), Philip Chan, MS (1), Mary Beth Serrano MA(1), Sandro Galea, M.D., Dr PH (2,3)

(1) Department of Psychiatry, University Hospitals Case Medical Center, Case Western Reserve University, Cleveland Ohio, (2) University of Toledo Health Science Center, Toledo, Ohio (23) University of Michigan, Ann Arbor, Michigan, (34) Columbia University, NY, NY. (4) University of Toledo Health Science Center, Toledo, Ohio.

Abstract Current Word count - 250

Objective - Study psychiatric comorbidity and suicidal ideation in an ongoing study of soldiers in the Ohio Army National Guard(OANG). Method - Of 12,225 soldiers invited, 63% agreed to participate. After collecting military information, we administered the social support module of the Deployment Risk and Resilience Inventory, Life Events Checklist, PTSD Checklist, Patient Health Questionnaire-9, the Generalized Anxiety Disorder(GAD)-7, and the Mini International Neuropsychiatric Interview (alcohol abuse (AA) and dependence (AD). Results – Within this random representative sample, 64% had at least one past deployment. The prevalence of PTSD within the past year were 6.88%, depression 13.95%, GAD 2.03%, AA 9.63%, AD 7.00%, and none of the above 63.07%. In soldiers with PTSD, GAD was 20 times more likely to have occurred within the past year compared to those without (OR 20.36; 95% CI 11.39-36.38), depression 7 times (OR 7.39; 95% CI 5.4–10.11), AD 3 times (OR 3.02 95% CI 1.99–4.58), and very highly increased risk for having at all 3 conditions (OR 60.86, 95% CI 17.33–213.78); 67% had previously sought help through a professional or a self help group. In soldiers with current PTSD accompanied by at least 2 comorbidities, suicidal ideation (which was present in 62% overall) was 7 times more likely to occur (OR 7.46; 95% CI 3.05-18-26). Conclusions - These findings suggest that soldiers with PTSD frequently have a co-occurring mental health condition and a history of suicidal ideation, which highlights the complexity of this patient population and the magnitude of associated human suffering.

Funding Source: Department of Defense Congressionally Directed Medical Research Program: W81XWH-O7-1-0409, the 'Combat Mental Health Initiative'.

Conflicts of Interest: none

Title: Baseline Results and Validation Methods of a 10 year Longitudinal Study of the Ohio Army National Guard.

Primary Topic
Epidemiology

Secondary Topic
PTSD

Educational Objective
At the conclusion of this session, the participant should be able to recognize the importance of screening for alcohol use disorders, depressive disorders and PTSD in individuals who have served in the military.

Abstract

Objective
To explore lifetime prevalence of mental disorders and report reliability and validity findings from the baseline year in an ongoing study of the Ohio Army National Guard (OHARNG).

Method
2616 randomly selected OHARNG soldiers received an hour-long structured telephone survey including the PTSD Checklist (PCL-C) and Patient Health Questionnaire – 9 (PHQ-9); a subset (N=500) was randomly selected to participate in 2 hour clinical reappraisals, using the Clinician-Administered PTSD Scale (CAPS) and SCID. Interviews occurred between Nov. 2008 and Dec. 2009, and there was an overall 43% participation rate.

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Co-Author(s) Information
Marta Prescott MPH, Joseph Calabrese, M.D., Israel Liberzon, M.D., Renee Slembarski, M.B.A., Emily Goldmann, M.P.H., Edwin Shirley, Ph.D., Thomas Fine, M.A., Toyomi Goto, M.A., Kimberly Wilson, MSW, Stephen Ganocy, Ph.D., Philip Chan, M.S., Alphonse Derus, B.S., Mary Beth Serrano, M.A., Sandro Galea, M.D.

Literature References

Vogt DA, Samper RE, King DW, King LA, Martin JA: Deployment stressors and posttraumatic stress symptomatology: comparing active duty and National Guard/Reserve personnel from Gulf War I. J Trauma Stress 2008; 21:66-74.
Hoge CW, Castro CA, Messer SC, McGurk D, Cotting PI, Koffman RL: Combat duty in Iraq and Afghanistan, mental health problems and barriers to care. N Engl J Med 2004; 351:13-22.

ABSTRACT

Risky driving behavior among Ohio Army National Guard soldiers

Hoggatt KJ, Goldmann E, Prescott M, Calabrese J, Tamburrino MJ, Liberzon I, Galea S

Nearly half all forces engaged in the recent wars in Iraq and Afghanistan were reserve forces and there is an increasing reliance on national guard soldiers in combat. Although there is emerging evidence of long term behavioral disorders after deployment among these forces, we know little about health risk behavior, such as risky driving,among national guard soldiers. We recruited2616 Ohio Army National Guard soldiers, 1294 of whomhad been deployed and experienced at least one traumatic event during the most recent deployment. Overall, 12% reported drinking and driving within the past 30 days, 26% reported passing cars on the right often within the past year, and 25% reported ignoring speed limits during the night or early morning often within the past year. Mental health (PTSD, generalized anxiety disorder, major depression) and alcohol abuse or dependence wereassociated with increased risky driving. In men, alcohol abuse or dependence predicted risky driving (drinking and driving: odds ratio (OR) and 95% confidence interval (CI) =7.5 (5.0, 11.4); passing on the right: 2.5 (2.0, 3.1); ignoringspeed limits: 2.2 (1.8, 2.7)even after controlling for mental health history, deployment, and demographic characteristics. Results for women were similar.Deployment was associated with risky driving for men (OR (95% CI): 1.6 (1.1, 2.3) for drinking and driving, 1.6 (1.2, 2.1) for passing on the right, and 1.2 (0.9, 1.6) for ignoring speed limits). Among recently deployed men, risky driving increased with the number of traumatic events experienced.Post-deployment support of reserve forces, particularly those who have seen combat, should include attention to potential for health risk behavior such as risky driving.

Area topic: Psychiatric epidemiology

Title of Paper: Mental health disorders increase the risk of during and post-deployment alcohol abuse among Ohio Army National Guards

Conference: International Society for Traumatic Stress Studies 27th Annual Meeting

Presentation Type: Oral/Poster Presentation

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Authors: Brandon DL Marshall, Marta R Prescott, Joseph R Calabrese, Marijo B Tamburrino, Israel Liberzon, and Sandro Galea

Presented By: Marshall BDL

Background: Alcohol use disorders are common in military personnel; however, it is not clear if mental health conditions increase the risk of during and post-deployment alcohol abuse among this population.

Methods: Ohio National Guards were randomly selected to complete computer-assisted telephone interviews between June 2008 and February 2009. The primary outcome was reporting alcohol abuse meeting DSM-IV criteria first occurring during or post-deployment. Primary exposures of interest included during-/post-deployment major depressive disorder (MDD) and posttraumatic stress disorder (PTSD). Predictive logistic regression was used to determine the independent correlates of during-/post-deployment alcohol abuse.

Results: Of 963 deployed participants, 113 (12%) screened positive for during-/post-deployment alcohol abuse, of whom 35 (34%) and 23 (33%) also reported during-/post-deployment MDD and PTSD, respectively. In a multivariate model MDD (adjusted odds ratio [AOR] = 3.89, 95%CI: 2.12-7.15, $p<0.001$) and PTSD (AOR=2.73, 95%CI: 1.37–5.42, $p=0.004$) were associated with alcohol abuse. The conditional probability of during-/post-deployment alcohol abuse was 7%, 16%, 22%, and 43% among those with no MDD/PTSD, PTSD only, MDD only, and both PTSD and MDD, respectively.

Conclusions: We observed a high prevalence of during-/post-deployment alcohol abuse among Ohio National Guards. Concurrent mental health conditions were highly predictive of developing alcohol abuse, and thus may constitute an etiologic pathway through which deployment-related exposures increase the risk of alcohol problems.

Count: 211 words, 1397 characters (max. 1400 characters)

Panel Presentation: Identifying predictors of trauma response: State of the art of current prospective studies of PTSD

Psychiatric Comorbidity in the Baseline Sample of 2,616 Soldiers in the Ohio Army National Guard Study of Combat Mental Health

DESCRIPTION

Section 1: Primary Purpose or focus of the panel.

Study psychiatric comorbidity in the baseline sample of an ongoing long-term study of soldiers in the Ohio Army National Guard (OANG).

Section 2: Experimental design or Methods used.

Of 12,225 soldiers invited, 63% agreed to participate. After collecting military information, we administered the social support module of the Deployment Risk and Resilience Inventory, Life Events Checklist, PTSD Checklist, Patient Health Questionnaire-9, the Generalized Anxiety Disorder (GAD)-7, and the Mini International Neuropsychiatric Interview section on alcohol abuse (AA) and dependence (AD). Assessment tools were tested in clinical re-appraisal.

Section 3: Summary of results.

Within this random representative sample, 64% had at least one past deployment and the prevalence of PTSD within the past year were 6.88%, depression 13.95%, GAD 2.03%, AA 9.63%, AD 7.00%, and none of the above 63.07%. In soldiers with PTSD, GAD was 20 times more likely to have occurred within the past year compared to those without (OR 20.36; 95% CI 11.39-36.38), depression 7 times (OR 7.39; 95% CI 5.4–10.11) and AD 3 times (OR 3.02 95% CI 1.99–4.58). Soldiers with PTSD were also at high risk for having had all 3 conditions (OR 60.86, 95% CI 17.33–213.78) and 67% had previously sought help through a professional or a self help group.

Section 4: Conclusion statement.

These findings suggest that while the OANG are facing as much combat as the regular army, in cross-study comparisons, it appears that they are rather resilient to mental health conditions common after combat exposure. For those who do have PTSD, they almost always have a co-occurring mental health condition, which highlights the complexity of this population and the magnitude of their unmet clinical need. Participants are administered the survey annually in order to study the longitudinal trajectory of psychopathology.

UNIQUE DATA

In a representative sample of National Guard soldiers we found that soldiers with PTSD were more likely than soldiers without PTSD to report suicidal ideation and that among those with PTSD, comorbidity with more than one disorder was associated with a substantially higher risk for suicidal ideation. The association between PTSD and suicidal ideation in the National Guard adds to the growing evidence of this association in military populations. The data is unique as no other projects have focused on the National Guard or non-treatment seekers outside of the veteran's administration.